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SEPTIC THROMBOSIS OF THE CAVERNOUS SINUS, WITH REPORT OF A CASE.

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(*With temperature chart.*)

ON April 27, 1907, I was called by Dr. Fisher to see a patient with the following history:

N. J. (colored), age twenty-two; married; occupation, house work. Family history negative as far as present condition is concerned. Previous history: Usual diseases of childhood. Married three years. No children. She has been in fairly good health; no trouble in nose or head before present attack. No discharge from nose. No trouble in ears at any time.

Dr. Fisher was called to see patient this morning because of pain in head and swelling and redness of left eye and general bad feeling, and when he saw condition of eye asked me to come and see the case with him, which I did and obtained the following history.

History of Present Disease: For last three weeks the molars in left inferior maxilla painful and sore and the jaw has been swollen. Has used simple home remedies. Has not been to a dentist. There has not been any discharge of pus or blood from mouth or jaw.

For the last week the left eye has been swollen and gradually getting worse. The eye and head have been slightly painful and patient has felt feverish and general malaise. Has been in bed nearly all the time for last four days and has had but little appetite. Patient says she has not been able to close her left eye, due to the swelling, for last two days.

Condition of patient when seen at home was that of a poorly nourished woman, with the appearance of having been sick some time. Marked exophthalmos left eye; movement of eye very much restricted and lids cannot be closed, due to œdematous condition of conjunctiva and the exophthalmos. Temperature 103°. Owing to the bad surroundings only a very superficial examination was made. No ophthalmoscopic examination. Patient was at once sent to City Hospital and placed on a liquid diet, free catharsis, and ice bag to head. T. 102.5°. P. 110. R. 24 on arrival at hospital.

April 28, 1907.—Patient rested fairly well through night. Temperature 5 A.M. 105.5°. P. 112. R. 24. Cold pack to reduce temperature. Condition at 9 A.M.: Lower jaw on the left side swollen and tender. Left eye: movements retarded in all directions and swelling more marked; a fold of conjunctiva between the lids but there is no paralysis. The pupil reacts to light and on accommodation. The fundus is apparently normal unless for a slight dilatation of the temporal veins. Right eye slightly swollen but otherwise normal. Ophthalmoscopic findings negative. The patient complains of pain especially in left eye and left side of head, not severe but a dull ache. Patient answers questions very well.

An ice pack was ordered, as temperature was still 104°. I saw the patient at 1 P.M., but conditions were not relieved in any respect. The house surgeon, Dr. Hudson, had made a general physical examination and reported chest, abdomen, etc., negative. The temperature 104.2°. P. 126. Patient was anæsthetized and two lower molars on the left side were extracted. I probed the jaw very thoroughly, but did not find any pus, nor were the teeth in bad condition. Thinking there might possibly be some pus in orbit an incision was made both above and below eye and orbit was probed to

apex, but no pus was found. Patient was placed in bed and temperature gradually fell to 102°.

April 29, 1907.—Patient rested fairly well and at 5 A.M. temperature was 99.5°; P. 96. Condition of eye just about the same. The right eye has swollen but little. Still complains of pain in head and left eye. The ice cap was ordered to head and sponge if temperature rises. The temperature gradually rose till 3 P. M., when it was 104.8° and pulse 148. The general condition of patient worse. Patient more restless and pain in head slightly worse; complains of pain in back of neck. Ice pack ordered.

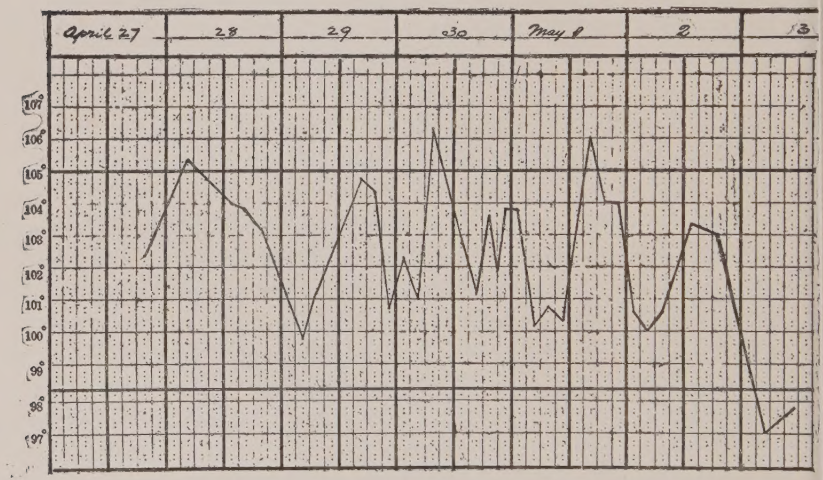
April 30, 1907.—Patient did not rest well. Temperature 106.2°; complains of quite marked pain in back of neck and shoulders, especially on movement. There is little if any rigidity of muscles. Dull pain in head and eye. There is marked tenderness of muscles of neck and shoulders.

Condition of eyes as found by Dr. Ellett and myself at 9 A.M.: O. D. slight conjunctival swelling and exophthalmos. Fundus normal. Pupils react to light and on accommodation. O. S. very marked œdema of conjunctiva with protrusion through the lids. Lower half of cornea not covered by lids. Ophthalmoscopic findings: Slight dilatation of temporal veins, especially the inferior; otherwise fundus negative. Ears examined and found in normal condition. There is not any swelling over mastoid or in the neck. Patient answers questions fairly well, but seems drowsy and does not answer promptly. Diagnosis septic thrombosis of cavernous sinus confirmed. Patient ordered an ice pack and temperature soon fell and was down to 100° most of the day.

May 1, 1907.—Patient did not rest well. Temperature 103.8° early in the night but dropping to 100.4° by morning. The general condition of patient worse. Takes some nourishment. Right eye is not swollen as much as it was. Pupils very small and fundus not visible. O. S. exophthalmos more marked. Pupil almost pin-point. Temperature 3 P.M. 106°. R. 26. P. 168. Patient placed in ice pack, 5.30 P.M. Pupil larger after cocain; can make out but little in O. S., due to condition of cornea, especially lower half, which is breaking down even though wet boric cotton pad applied continuously. Right eye: The veins are twice the size of the arteries. The

patient is delirious and muttering as if in pain. There is no rigidity of neck, etc. Temperature 104°. Ordered ice pack and wet boric dressing to left eye. The blood count made by the pathologist, Dr. N. S. Ferry, gave white cells, 25,000; red, 4,500,000. The husband cannot be found to get consent to operate.

May 2, 1907.—Patient rested fairly well; after 12 o'clock condition has gradually become worse. Has been in semi-conscious condition all day. Temperature varying from 100° to 103° and pulse from 120 to 180. Patient at times is very restless but is very weak. Ice cap and strychnia ordered. The eyes are just about the same. Pupils are fairly good-sized. The cornea of left very dry in lower half



which is being slowly destroyed. Dr. Holder saw her in consultation but considered her too weak to operate on.

May 3, 1907.—Patient was quiet most of the night but slept but little. The temperature began falling at 9 o'clock last night and at 6 A.M. to-day was 97° (axilla). The patient now at 9 o'clock is delirious and restless. Temperature 96° (axilla). R. 20. P. 118. Condition is remarkably worse. The eyes are about the same, the left cornea being somewhat worse. The patient gradually became weaker and died at 4 P.M.

Findings at Autopsy by Dr. N. S. Ferry. There was an

œdematous condition of contents of the orbit. The lower half of cornea shows a dry sloughing ulcer due to exposure to the air. The privilege of removal of the eyes could not be obtained. The vessels of the dura, pia, and arachnoid were congested. There was coagulated fibrin in the fissures of the brain, more especially over the occipital lobes. There were a few bubbles of gas over the right temporal lobe. There was a cloudy exudate around base of the brain and in the spinal canal apparently an ounce and a half. Both of the cavernous sinuses and the circular contained septic thrombi. The walls of left cavernous sinus were in bad condition showing the effect of the virulent infection. The petrosal and remaining sinuses were not affected. The ethmoidal and sphenoidal sinuses were not opened; there was no discoloration of their walls nor were there to be found any sinuses leading into these cavities. Cultures were made from the spinal canal, both cavernous sinuses, and the occipital and temporal lobes, each showing a pure culture of staphylococcus.

All cases of septic thrombosis of the cavernous sinuses should be reported as the prognosis is so grave and as all told there are only about 200 cases on record. Dwight and Germain[1] with their four cases found 182 cases with only 14 recoveries. Dr. Ellett[2] reports three cases in 1904 with no recoveries. Several other cases have been reported, Stoker reporting the only recovery. More especially should those cases be reported in which autopsies have been made confirming or denying diagnosis. It is only through the study of these cases that early diagnosis can be made and the proper operative procedure instituted which gives us the only ray of hope we have.

Etiology.—The most important causes of septic thrombosis of the cavernous sinuses are infections in regions drained by the ophthalmic, facial, angular, and the pharyngeal plexus and its tributaries. Also the thrombosis may be caused by direct contact or continuity with the infective tissue as in sphenoidal and ethmoidal disease, also thrombosis in the other sinuses. Examples

of the first type are infections in the orbital cavity, which probably is the one most common cause, erysipelas of the face, pustules on the face, nostrils, etc. Infective processes in the tonsillar and pharyngeal region may travel to the cavernous sinus by the pterygoid plexus. Alveolo-dental periostitis or ostitis, Macewen says, may be the exciting cause and I am thoroughly satisfied that this was the etiological factor concerned in the case just recited. I was not permitted to make an extensive autopsy, but from the history and symptoms of the case I consider it clearly a case having its beginning in this condition in the left inferior maxilla presumably from a decayed tooth. There was a definite history of aching in the teeth and lower jaw and swelling preceding the symptoms of the infected sinus.

Symptoms.—The general symptoms are those of sepsis. In this case there was nothing of importance unless it was the height of the temperature, which might be seen in many cases of meningitis, etc. Pain is not a very prominent symptom and in this case the patient complained but very little.

Local Symptoms.—The symptoms which attract our attention when one of these patients is seen are the exophthalmos, œdema of the eyelids, conjunctiva, face, and nose. Paralysis of muscles of eye may also be a marked symptom. The œdema of the conjunctiva and lids and exophthalmos are due to the congestion of the veins and tissues behind the eyeball. This may be variable in extent, depending on the rapidity and amount of collateral circulation established. In this case the œdema and exophthalmos were very marked in the O.S. from the time I first saw the patient and continued so till her death with very little abatement. The exophthalmos and œdema were only noticeable in the O.D. for thirty-six hours, about four days before death of patient, gradually disappearing. Œdema of the mastoid region is mentioned by Fuchs and others. This condition Fuchs

says is caused by blocking of an emissary vein of the mastoid region which empties into the transverse sinus. I have never seen this symptom and I think it must be very rare judging from the report of cases. Dr. H. Griffith[3] (Manchester) has reported two cases with this symptom present. Obstruction to the outflow of blood through the central retinal vein may cause a severe choked disk or only a very slight dilatation of veins and œdema of retina or even none at all. H. Parsons[4] says obstruction of retinal veins does not take place in this condition as usually stated.

The nerves affected are the second, third, fourth, fifth, and sixth; the third the most often, causing ptosis, strabismus, etc. The strabismus depends upon which nerve was affected first and also on the extent. Percy Flemming[5] noticed that the first sign of involvement of the opposite sinus was paralysis of the sixth nerve of that side. Macewen says miosis is generally present at the beginning, but as pressure becomes greater stabile mydriasis ensues. In this case the pupils were always small, being pin-point part of the time and never dilating widely even under cocain. The eye had some movement in all directions all the time and seemingly was impeded only by the exophthalmos and œdema. The sight may be only slightly affected or be entirely gone, depending upon the amount of œdema of the retina, pressure on the nerve, etc.

Diagnosis.—In typical cases the diagnosis is not difficult. Exophthalmos and œdema of eye, dilatation of retinal veins, and œdema of retina with severe septic symptoms should enable one to arrive at a diagnosis. If œdema of the mastoid or symptoms of involvement of the second eye are present the diagnosis would be much easier. The differential diagnosis is between orbital cellulitis, tenonitis, and erysipelas, which should not be difficult. The œdema of the mastoid or the implication of the second eye should allay all doubt. Of course if

the retinal veins are dilated that would eliminate other infections.

Prognosis.—The prognosis is always very grave, there being only two or three authentic septic cases which have recovered. Macewen makes the statement that absolutely all infective cases end fatally. F. Stoker[6] of Lucerne reports a case which lived four years.

Prophylactic Treatment.—As the prognosis is invariably bad the prophylactic treatment becomes all the more important. In dealing with infected ulcers, pustules, etc., especially of the eye, face, and nose, one cannot be too careful and every precaution should be taken. Suppurative diseases of frontal, sphenoidal, and ethmoidal sinuses should be promptly attended to, also thrombosis of the lateral or petrosal sinuses should be properly treated before extension to cavernous sinus occurs, when it is too late to save life.

Active Treatment.—If the orbit contains pus it should be treated surgically, incised and pus evacuated. The eye should be treated so as to prevent sloughing of cornea. Baths, etc., for high temperature.

F. Stoker thinks the early opening of primary focus in orbit had much to do with recovery of his case.

Operative Treatment.—Hartley, Knapp, Ellett, Dwight, Germain, Luc, and others recommend operative measures. Luc, after work on the cadaver, would have us try going through maxillary sinus, through the nasal wall into the sphenoidal sinus through its anterior wall, then through the lateral wall of the sphenoidal sinus, thus opening into the cavernous sinus. Robineau recommends a similar procedure. Hartley and Dwight make a horse-shoe shaped flap apex upward. The flap is carried as low down as possible so as not to disturb the zygoma, the anterior edge of the flap being $2\frac{1}{2}$ inches posterior to the external canthus. The field of operation is practically the same as that for resection of the Gasserian ganglion. After the temporal bone is trephined as low as possible

and opening enlarged by bone forceps, the dura is incised and the temporal lobe held upward, and the cavernous sinus is palpated, incised, and clot removed and drainage instituted. Dwight[7] says the operation is not associated with extreme difficulty, and that it can be done under almost primary anæsthesia; that it is not associated with any degree of shock, and can be finished in a few minutes, and that the hemorrhage is easily controlled. In the case just reported, before the consent to operate could be obtained the patient was in such a critical condition it was deemed unwise to operate. I am firmly convinced that operative procedure should be instituted in every case of septic thrombosis of the cavernous sinus as without it the prognosis is almost invariably bad, and with it, if the cases are taken early, the prognosis would certainly not be so grave.

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THE TREATMENT OF TRICHIASIS.

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CASES of trichiasis may be divided into three groups: Those caused by entropion, those caused by the growth of adventitious lashes in a false position, the so-called "distichiasis," and, finally, trichiasis caused by a combination of these two causes. The last group contains the largest number of cases which require treatment in a land where trachoma is endemic.

Trichiasis may be found at any age from three years or younger to seventy. It may exist in any degree of severity. In the severe cases all the lashes may sweep the globe, and the palpebral slit may be contracted by conjunctival atrophy and tarsal contortion till the eye is almost immobile. In the slight cases partial entropion may invert a few lashes, or there may be only one or two misplaced cilia which touch the cornea.

Trichiasis may cause little or no trouble. I have seen many cases in which, though a whole row of cilia scraped over the cornea, the patients have refused to allow an operation, declaring that there were no hairs in the eye. On the other hand, one or two lashes touching the cornea of sensitive individuals may cause great pain, lachrymation, and irritation.

Very often a complete secondary row of lashes grows

from the inner margin of the lid, sweeping the globe. In these cases an ordinary splitting operation is very difficult.

The first object of a trichiasis operation must be to effect a permanent cure; the second object, to remedy the defect without causing lagophthalmos or other deformity.

Trichiasis operations naturally fall into two groups, those in which the tarsus is split from the edge, and those in which it is divided transversely. There is a third group of operations only applicable to trichiasis localized at the canthi.

Operations in which the tarsus is not attacked need not be considered, for in any but the most trivial cases they are quite ineffective.

After performing over a thousand operations for trichiasis I have found that the following methods meet all cases: Van Millingen's, Snellen's, a modified Spencer-Watson, and simple excision with a lip graft. The last two operations, which I have fully described in the *Ophthalmoscope* (vol. iv., No. 7, p. 377), are only applicable to special cases.

The "splitting operations" which I have tried are, the Jaesche-Arlt operation, a combination of Arlt's operation with Hotz's; Waldhauer's operation and Van Millingen's operation.

I have given the simple Jaesche-Arlt operation a very full trial and have found it useful only in slight cases. In severe trichiasis the tarsus is thickened, often to an enormous extent—I have seen it at least 3.5*mm* thick. There is much more cicatrization at its ocular than at its outer surface, and in consequence it is in tension, and has a constant tendency to spring inwards. This tendency is more marked on its inner aspect. When the lid is split the inner lip contracts and incurves; in consequence the outer lip, bearing the cilia, has no support even when the skin has been shortened, and the cilia tend to drop

inwards. A large gap is left which closes by cicatrization. This cicatrix contracts and draws the lashes inwards again. For this reason these operations are often in severe cases a failure from the first, and, even if the initial result is good, they soon relapse. I have known an apparently good result return in a month, to be permanently cured by Van Millingen's operation. In order to remedy this defect I made the split more oblique, so as to completely detach the lash-bearing edge; I then stitched it down to the tarsus higher up in such a way that the lashes pointed rather upwards at first, combining the procedures of Arlt and Hotz. The results of this modification were good as regards permanent cure, but a large gap was left, and much thickening resulted from the healing process. J. W. Barrett, of Melbourne, has highly recommended this operation, and he stitches the inner lip to the lower lid for a day or two to keep the gap open for a longer time (vide *Ophthalmoscope*, vol. ii., No. 9). After performing this operation a large number of times I have completely abandoned it on account of its bad cosmetic effect.

In Waldhauer's modification of the Jaesche-Arlt operation the split is made obliquely so as to detach the lower edge of the outer lip of the split, and the piece of skin removed is left attached at its extremities and pushed down into the split. It is adjusted in place and readily grows there. The first result is excellent. So good is it that I was at one time led into performing the operation a large number of times. But after a few months nearly all the cases returned. In all of them the hairs in the skin-graft had hypertrophied and the artificial trichiasis induced was as bad as the primary condition. In a few of the cases the skin-graft had become much broader, pushing up the lashes and causing a very ridiculous effect. In all these cases I was obliged to cut out the skin and substitute a lip graft. At the present time cases come to the hospital in which the operation has been performed

outside, always with the same result. It may be laid down as a rule without exception that skin may, in no case, be grafted into the lids internally to the lashes. It will always cause a secondary trichiasis.

Van Millingen's remains the only satisfactory splitting operation. After performing it a large number of times I have concluded that it is by far the best of all operations for trichiasis. It is especially indicated where there is conjunctival atrophy, where the tarsus is short, and in relapses from other operations, especially from Snellen's. It is perhaps rather a severe procedure in very slight cases, and it takes a long time to perform, a consideration in the East, where at certain times of the year there may be thirty lids to be treated in one day!

The operation is performed in the following manner: The patient should a fortnight before be instructed not to epilate his lashes. He should be anæsthetized, and the cilia cut quite short from both upper and lower lid. The lids should be disinfected by being washed with warm water and soap, with alcohol, and with a solution of biniodide of mercury, 1:500. A Snellen's clamp is now inserted backwards and the lid everted. A very much better clamp for the purpose could be constructed, but Snellen's suffices. The lid is now carefully split from end to end of the clamp, the clamp is removed, and the split continued outwards and inwards into the skin surface at each canthus. It may be carried 1–2*mm* into the skin, and deepened to 7*mm*. It is absolutely essential that the split shall be long and deep, so that it loses its tendency to close and gapes naturally. If the trichiasis extends to the canthi the split should be carried well into the skin at each end. Any vessel seen to be spouting should now be twisted. The clamp is now inserted in its natural position, and a piece of skin removed from the lid exactly as in the Arlt operation. Its breadth will depend upon the amount of loose skin in the lid. In many cases it is unnecessary to remove any at all. The skin wound is now

sewn up and the clamp removed. As soon as the bleeding from the split tarsus has ceased the inner lip should be carefully examined with a lens to detect hair follicles. Should any be found they must be excised with scissors. If any roots are left behind they will grow and appear between the inner lip and the graft, in a very undesirable position. The patient should now be well under the anæsthetic. A pad of wet wool is placed inside the lower lip, which is everted and compressed at each end between the fingers and thumbs of the assistant. With a sharp knife a graft 2.5*mm* broad and as long as the split is marked out and detached with a pair of sharp scissors. While the assistant sews up the lip wound the graft is spread on the back of the hand, and the submucous tissue removed with curved scissors. If there is now no bleeding from the wound it is gently scraped to provoke a little hemorrhage, and the graft adjusted in place. It should be gently pressed till the blood has coagulated under it and has luted it down. Should there be trichiasis at the canthi the graft must be long enough to enter the skin. As soon as all hemorrhage has ceased the graft is gently wiped clear of blood-clot, and the eye irrigated with boracic lotion or normal saline. The lower lid must now be well greased with boracic vaseline to prevent any possibility of the graft adhering to it. A piece of well greased oil silk is used as a dressing. The dressing should be removed after twenty hours. The greatest care must be taken that the graft does not adhere to the dressing, which should be removed by the surgeon himself. The eye should be kept covered for four days or the graft may become desiccated. If these precautions are followed the graft will almost invariably adhere. If the lid be insufficiently split the graft may be squeezed out of place. If at the first dressing it is found that this has happened the split should be reopened and the graft inserted again. It has a most extraordinary vitality, and this procedure is generally successful. After a very

few days the graft can hardly be distinguished from the conjunctiva. The only failure that is common is the appearance of one or two lashes internal to the graft. These lashes must be removed by two curved incisions, which include the lashes, and are deep enough to enable the root follicle to be excised. If the lid be tightly held in Grady's forceps the operation is almost painless.

If it is decided to perform the operation on a case of distichiasis where the lashes spring from the extreme inner margin of the lid, an extremely common state of things, the split must be made first in a transverse direction, and then parallel to the lid surface. In this case there will be several root follicles on the inner lip. These must be removed. Van Millingen's operation is perhaps not best suited to these cases, but there is often so much atrophy that Snellen's operation would inevitably produce lagophthalmos.

The chief operations in which the tarsus is divided transversely are Snellen's, Panas's, and Burow's.

I have found that Panas's operation, though very efficient, causes much ugly thickening, and in cases where there is much atrophy the lash-bearing fragment is liable to slough.

Burow's operation is liable to an early relapse. The tarsus is divided from the inside, and the contraction of the cicatricial tissue formed draws the lashes inwards.

Snellen's operation, as modified by Cant, has been performed in the British Ophthalmic Hospital, Jerusalem, considerably over ten thousand times. In selected cases it gives an excellent result, and the cosmetic effect is almost always good. In fact, in the majority of the cases it is difficult to tell that an operation has been performed. In order that it may be successful it is necessary that the tarsus be of good breadth, the operation must on no account be repeated, and there must not be conjunctival atrophy. If the trichiasis extends to the canthi the

operation must be combined with canthoplasties at either or both angles.

The objections to the operation are that a considerable number of the cases relapse, and if the tarsus be short, or the operation be repeated, lagophthalmos results. If there is much atrophy the lower fragment may slough wholly or partially. A canthoplasty does not seem to render sloughing more frequent.

Cant's modification of the operation is performed as follows: Snellen's clamp is inserted, and the skin divided from one end of the clamp to the other, close to the lid margin. A second incision is carried through the skin at a height above the first which is gauged by the amount of loose skin in the lid. The piece of skin between the two incisions is removed. It is generally about 3·5*mm* broad. The skin is now reflected upwards, cleaning the tarsus and removing the fibres of the orbicularis.

The cartilage is now incised from one end of the clamp to the other, close to the roots of the cilia, and the incision is carried down to the conjunctiva. A second incision is made parallel to the first from one to two millimetres above it. This incision is also carried down to the conjunctiva. The narrow strip of tarsus included between the two incisions is now removed with scissors, leaving a long trough whose floor is formed by the conjunctiva.

The lower cilia-bearing fragment is now sutured to the tarsus above the trough, as in Hotz's operation, by four sutures. These sutures may or may not include the skin. When the sutures are tied after removing the clamp the cilia will all be everted. In very slight cases the piece of tarsus removed may be a mere shaving, or one incision may suffice.

The first incision must not be made too close to the roots of the lashes or they may fall out and cause alopecia; on the other hand, the nearer the trough is made to the margin of the lid the better the eversion.

Van Millingen's and Cant's operations are applicable

to most cases of trichiasis. For slight cases Cant's is better. It takes a shorter time, the cosmetic effect is certain, and it is a much less formidable operation. On the other hand, it weakens the tarsus and shortens it. The trachoma also tends to shorten the tarsus. In severe cases or where the trachoma is still progressive it should not be done. Van Millingen's operation, on the contrary, lengthens the conjunctiva, which is being shortened by the disease. It removes nothing, and so it can be applied to all cases. Cant's operation is very prone to recurrences. So far I have never seen a recurrence from Van Millingen's. They probably occur as the disease progresses, but the operation can be repeated. It must be borne in mind that in the East babies in the first year of their life may have pronounced follicular trachoma; at three they may have trichiasis. In such cases where the tarsus has a lifetime in which to shrink and curl inwards no operation which removes tissue should be performed. For children Van Millingen's operation should always be chosen.

For trichiasis of the lower lids I always perform Snellen's operation exactly as for the upper lid. If, however, as is often the case in young children the lids are much rolled in, Panas's plastic operation must be adopted. It gives good and permanent results with little or no deformity.

In certain cases where there is much atrophy combined with entropion of the upper lids Van Millingen's operation might be first performed, and later on be followed by Cant's. My patients have, so far, not had sufficient patience to allow me to try this method.

A CASE OF UNILATERAL CONGENITAL FISTULA OF THE LACRYMAL SAC, WITH A REVIEW OF THE LITERATURE.*

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IN reviewing the literature on congenital fistula of the lacrymal sac I find only one who offers any explanation for the occurrence. Manz,[1] "while he considered it doubtful whether there was such a thing as congenital fistula, but admitting its possibility, would regard it as an arrest of development, an imperfect closure of the groove which in the embryo runs from the eye to the olfactory pit"; to which opinion I subscribe as being the only plausible one to account for the condition. De Wecker[2] "on the other hand instances a number of cases from the writings of G. Baer, Scarpa, and others, and says of them, that the openings were all of the capillary variety, the lacrymal fluid did not discharge through the defect in the walls of the sac, except during crying or when a gentle pressure was made over the region of the sac itself."

In 1874, Dr. C. R. Agnew[3] reported in detail "a case of double extremely minute and apparently congenital lacrymal fistulæ" in a girl three years of age. History: When child was two years old a minute drop of clear fluid was observed exuding from the region of the left lacrymal sac at a point immediately below the tendon

* Presentation of patient before the Ophthalmological Section of the New York Academy of Medicine, April 20, 1908.

of Horner's muscle. Six months later a similar drop of fluid was observed exuding from a similar point over the right sac. No history of inflammation about eyes or sacs and no treatment was given.

In 1892 Hartridge[4] reported very briefly "a case of probably congenital double lacrymal fistulæ" in a boy eleven years of age, who had first noticed the condition about three months previous to his examination. Wray in discussing the foregoing case stated "that he had seen this condition associated with other congenital conditions, as, for instance, the remains of a hyaloid artery."

In 1894, Casey Wood[5] reported "a case of congenital bilateral and symmetrically placed fistulæ of the lacrymal sacs," occurring in a man thirty-five years of age. The condition was first noticed when he was eighteen years old. Examination revealed minute cicatricial points of puckered scar tissue, at the inferior edge of either lacrymal sac, the one on the right side being slightly lower than the one on the left, the distance from the canaliculi being about 5*mm* on left side and 6*mm* on right side.

In 1895 John Dunn[6] reported "a case of monolateral fistula of the lacrymal sac situated above and parallel with the inferior canaliculus" occurring in a man forty years of age. From his description it would appear that this was a case of supernumerary canaliculus. The inferior punctum was normal in size and appearance and opened into the canaliculus, which in turn allowed the passage of a probe into the sac. Directly internal to the punctum was a narrow slit about 1½*mm* long, through which liquid if injected passed into the lacrymal sac, and thence into the nose. This secondary canal was directly above and parallel to the inferior canaliculus and opened by its own mouth into the sac. There was no communication between the secondary canal and the canaliculus.

In the same year Dunbar Roy[7] reported "a case of congenital fistulæ of the lacrymal sacs," occurring in a colored girl fourteen years of age, associated with a

marked follicular catarrhal conjunctivitis." The openings into the sacs were situated symmetrically over the lower portion of each sac. In this case we note the history of inflammation of the conjunctiva associated with the condition, although it appears to be a congenital affair.

In 1898 J. S. Barnes,[8] of Milwaukee, reported "a case of bilateral congenital fistulæ of lacrymal sacs," in a Polish girl of ten years of age, associated with epicanthi and a history of chronic purulent blennorrhœa of the lacrymal sacs of several years' standing. Taking into consideration the fact of a long-standing chronic purulent blennorrhœa being associated with the fistula of the sacs I think a strong doubt naturally arises as to it being a congenital case.

The case, J. G., age 21 months, which I am privileged to report, was brought to my clinic at the New York Ophthalmic and Aural Institute on April 4th by his mother, who stated that "very shortly after birth (during the first or second day), she noticed drops of clear water running out of the small hole in the upper part of the right side of the nose between the eye and nose, which had continued unchanged up to the present time," and she desired treatment which would correct the condition. Upon questioning her, she stated that the baby's eyes or eyelids had never been sore nor inflamed, and no mucus nor purulent discharge was ever present; and no evidence of any inflammation of the eyes, eyelids, or sac exists. Upon examination a minute vertically oval capillary opening, which would admit a needle probe, was observed situated over the centre of the right lacrymal sac immediately below the canthal ligament and about 5*mm* from the punctum lacrymale, the edges of which were not thickened, elevated, nor depressed, being on a level with the surrounding skin and through which the tears exuded. The condition of his nose was normal, nothing pathological being observed. Upon instilling a drop of fluorescin into the cul-de-sac of his right eye, colored tears would flow from the fistula. Upon closing the latter with adhesive plaster the stained fluid would run

into his nose, showing that the canaliculi and duct were patulous. While there was more or less constant oozing of tears present, though small in amount, the flow was increased by the patient's crying or anything which increased the secretion of the tears, and by pressure on the sac. The only other congenital defect present was a nævus about the size of a quarter dollar situated over the left upper antero-superior parietal region.

This is the youngest case of congenital lacrymal fistula ever reported, and the first one in which the fistula was noticed practically at birth, so that there can be no doubt about its being congenital. In all the other cases reported, with the exception of Agnew's, which was noted when the child was two years of age, they were first noticed at periods ranging from ten to forty years after birth. The symptoms about which complaints were usually made to the physician were the accumulation of tears in the corners of the eyes with epiphora, and a moisture over the aperture, especially when out in a strong wind or upon using the eyes very much for near work causing fatigue; and in my case a chapping of the face beneath the fistula during the cold weather. None of the cases received any treatment except astringent collyria, which did not relieve the condition. As I have had considerable success in closing fistulæ of lacrymal sacs resulting from inflammatory conditions, with the galvano-cautery, I propose to attempt to close the fistula in this case in the same manner.*

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* Since presenting this paper I have succeeded in closing the fistula with one application of the galvano-cautery, without reaction, and with apparently perfect result.

4. Agnew. *Trans. Amer. Ophth. Soc.*, 1874, 209, 210.
5. Wood. Archives Ophthal., 1894, xxiii., 25–27.
6. Dunn. Archives Ophthal., 1895, xxiv., 251.
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DACRYOCYSTITIS DUE TO TYPHOBACILLI.

By Dr. MATTHIAS LANCKTON FOSTER.

THE following case is the only one of dacryocystitis that has come under my observation in which the typhobacillus has been demonstrated to be present and the probable cause of the disease and for that reason seems to me to be worthy of record, although it may be that a routine bacteriological examination of the pus from all cases of dacryocystitis would prove that that micro-organism is not as rarely the actuating cause as it now appears to be. The case is also of interest in connection with the recent discoveries of typhobacilli in inflamed gall bladders of typhoid fever carriers, and the question suggests itself whether various purulent inflammations of mucous membranes may not prove ascribable at times to an antecedent typhoid fever, and whether persons suffering from such inflamed mucous membranes are not active distributors of typhoid.

An Italian boy eleven years of age entered the New Rochelle hospital where he was treated for typhoid fever and was discharged cured in February, 1906. Three weeks later he reappeared with a large inflammatory swelling of the left lower lid and of the adjoining portion of the cheek which presented the usual characteristics of an acute dacryocystitis. Bowman's operation was performed under general anæsthesia and the patient made a good recovery after a few weeks of probing.

Cultures were made in bouillon and blood serum by Dr.

S. B. Pray from the pus in the lachrymal sac and were found to present the characteristics of pure cultures of typhobacilli so distinctly and definitely as to render it a matter of the highest probability that the inflammation of the lachrymal sac was dependent on these micro-organisms alone.

TWO NEW ASTIGMATIC CHARTS.

By Dr. HARRY C. PARKER,

ASSOCIATE PROFESSOR OF OPHTHALMOLOGY, INDIANA UNIVERSITY SCHOOL OF MEDICINE, INDIANAPOLIS, IND.

(*With two figures on Text-Plate IV.*)

IN 1899 Verhoeff[1] presented two new charts for the estimation of astigmatism, which were superior to any others at that time obtainable. I used these charts with excellent results for two or three years, but at the end of that time modified his Chart No. 1 as shown in the accompanying figure (Chart No. 1, Text-Plate IV.). After five or six years' use of this modification I am convinced it is more accurate than Verhoeff's, and much less confusing to the patient.

About a year ago I modified Verhoeff's Chart No. 2, as shown in Chart No. 2, Text-Plate IV. As will be noticed in both the accompanying charts, a 10-degree interval is used between the lines rather than the 15-degree interval of Verhoeff's charts. In Chart No. 2, aside from decreasing the interval between the radiating lines, the two heavy lines which cross the small lines at right angles were dispensed with, and instead short heavy lines were placed at the periphery of the disk to mark the axis of the fine lines. The heavy lines in Chart No. 2 of Verhoeff were often confusing to the patients, as their attention would be directed to them instead of the fine lines on which the value of this chart rests.

[1] *Ophthalmic Record*, November, 1899.

Dr. John Green, Jr.[1] has recently stated that he has had a similar difficulty in using Chart No. 2 of Verhoeff and suggested a modification which I have had in use for about a year.

The charts are used in the same manner recommended by Verhoeff in his original article as follows: With or without cycloplegia Chart No. 1 is placed at a distance of 20 feet before the patient and the vision of the eye to be tested is blurred—*i.e.*, put into condition of myopia. The patient then chooses the most distinct line on Chart No. 1, which indicates the axis of the correcting cylinder if the astigmatism is hypermetropic, and right angles to the correcting cylinder if the astigmatism is myopic.

Should the patient see lines 90 and 100 equally clearly, the axis would be 95. This at once shows the value of the 10-degree separation of the lines rather than the 15-degree separation. If three lines are seen equally clearly, the centre one represents the axis.

Chart No. 2 is then placed before the patient and rotated so that the fine lines in one axis run parallel to the axis chosen on Chart No. 1. This group of fine lines should be somewhat blurred, but they will be less blurred than the fine lines at right angles to them. Concave cylinders of increasing strength are placed in the axis at right angles to the clear lines until all the lines appear of equal density—*i.e.*, neutralized. The cylinder necessary to neutralize these lines represents the amount of the astigmatism. If now the excessive myopia is neutralized with a suitable concave sphere, Chart No. 2 will appear as a nest of boxes, or very often the sense of perspective is brought out and the figure appears as a long room, the far end of which is the centre square.

In analyzing 1000 unselected cases of astigmatism taken from my own records I have found that 70 per cent. are off axis, varying from 5 to 45 degrees from the perpendicular or horizontal. The axis in these cases was more often

[1] "Verhoeff's Astigmatic Charts," *Ophthalmology*, April, 1908.

ILLUSTRATING DR. H. C. PARKER'S ARTICLE ON "TWO NEW ASTIGMATIC CHARTS."

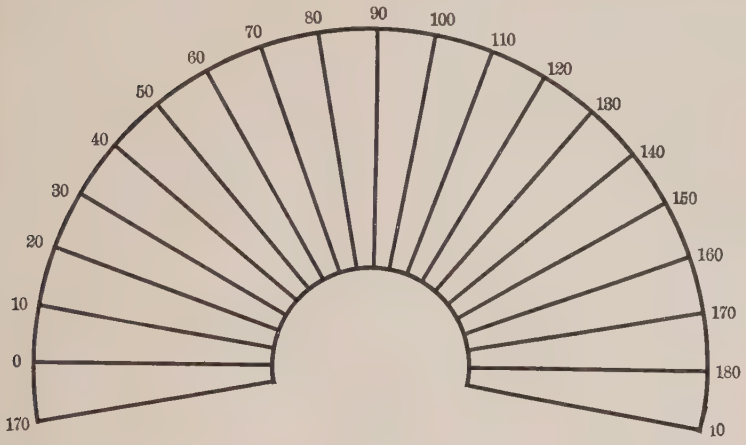


CHART NO. 1.

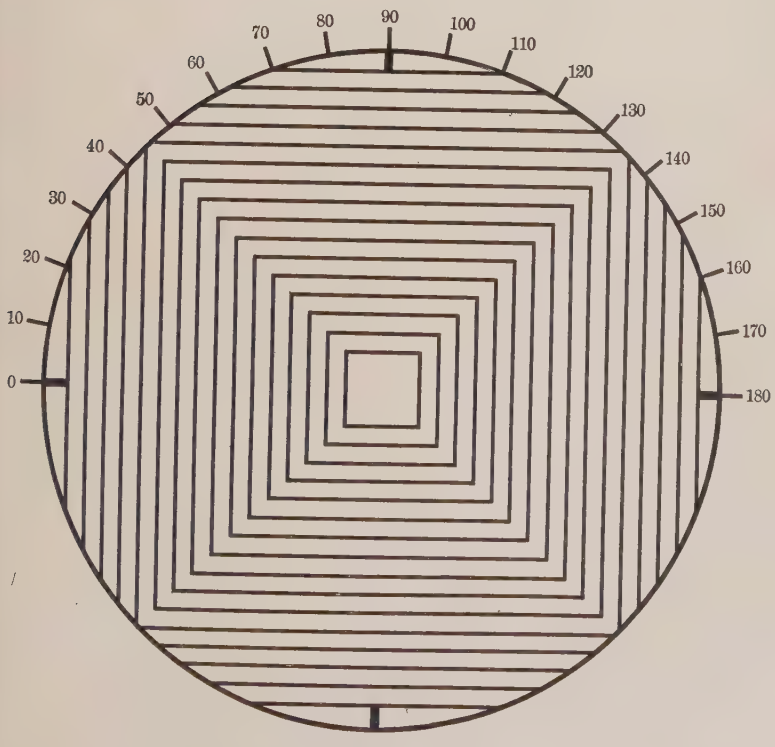


CHART NO. 2.

85, 110, 170, etc., than the regular 15-degree interval of Verhoeff's charts, or the ordinary trial frame, and for this reason the ten-degree interval of the accompanying charts seems more feasible than the greater interval of fifteen degrees.

These new charts are offered, not as anything original, but simply as modifications found less confusing and more accurate than the excellent originals of Verhoeff.

INVESTIGATIONS ON THE ORIGIN AND DEVELOPMENT OF TRACHOMA.

By Prof. GREEFF, Prof. FROSCH, and Dr. CLAUSEN, Berlin.

Abridged Translation by Dr. Arnold Knapp, from *Arch. f. Augenheilk.*, Vol. LVIII., No. 1, and Vol. LIX., No. 2.

(*With appended Plates XII., XIII., Arch. f. Augenheilk., LVIII.*)

PART I.

By Prof. R. Greeff.

ON looking over the publications which have appeared on trachoma during the last ten years, it is remarkable to observe that the subjects treated include only treatment, statistics, and general management of the disease, while the clinical symptoms, the origin and the course of the disease are disregarded. Notwithstanding the many uncertain points which still exist in this disease, no advance has been made in its clinical aspect. This is all the more astonishing as trachoma is the most widely disseminated disease which is known, scattered over the whole world, and while it is not fatal, nevertheless deprives millions of the ability to work and of pleasure in life.

The so-called unitarian standpoint, however, has been abandoned, where all follicles in the conjunctiva are regarded as trachoma. Most authors agree that there are benign follicles which cause but little irritation and disappear without leaving any injury to the eye; and, on

the other hand, that there is a peculiar form of infection with the formation of follicles, which, after existing for years, disappear with cicatrization, and result eventually in a complete cirrhosis of the conjunctiva. The limits between these benign formations and the malignant ones cannot be definitely stated, and even the most experienced physicians must see cases on the border line. We will not obtain any additional light on this disease until its cause is known and we are then enabled to observe the beginning stages.

In seeking the cause of this disease a number of peculiar difficulties are encountered. It is first of all not frequent to find recent cases which have not been treated; moreover, inoculation experiments are unsuccessful, as trachoma apparently cannot be transferred to animals. There has been a great deal of bacteriological investigation done in this line of work and a great variety of micro-organisms have been regarded as the cause of the disease; at the same time the specific organism which is the cause has not been proven. That, however, does not confirm the opinion of some authors that there is no special organism of trachoma.

I have devoted the last ten years to a scientific investigation of trachoma, and through the commissions of the government I have had extremely favorable opportunities of studying epidemics of this disease. It seemed impossible to advance with the use of the old methods, and I have tried a number of other methods, among others the cultivation of anaërobic organisms and the study of structures which resembled tubercle bacilli, because the follicle with its central area of softening appeared to me particularly to resemble the tubercle. The negative result of all of these examinations led me to the same opinion which others have expressed, that with our present methods the organism of trachoma cannot be demonstrated.

The wonderful discovery of Schaudinn led me to take

up the work again with the idea that there might be some analogy between syphilis and trachoma, since the development and course of trachoma is not unlike syphilis. The affection is principally in the lymphatic system, it develops slowly, it remains for a very long time, the sequelæ appear after many years, etc. I had the opportunity of learning the method of examination from Schaudinn and Hoffman and studied especially the Giemsa stain and the method of Levaditi, examining both normal and trachomatous conjunctivæ. Although spirochætæ occasionally occur on the conjunctiva, I have never observed them in the follicles and I have not been able to give them any relationship to trachoma.

I have during the past year had the good fortune of having as collaborator Prof. Frosch of the Institute for Infectious Diseases, and since the beginning of the year 1907 a pecuniary grant from the Prussian government has enabled us to bring our investigation to a conclusion.

PART II.

By Prof. Frosch and Dr. Clausen.

Starting from the generally accepted premise that trachoma results from the accidental introduction of conjunctival secretion from a trachomatous eye, we began our investigations by examining the conjunctival secretions of those suffering from trachoma. This secretion was removed with all caution, dried in the air, stained with a dilute solution of carbol-fuchsin and differentiated with slightly acidulated distilled water. In addition to the organisms which have always been found in the conjunctiva, we were struck by the appearance of very small, just visible cocci surrounded by a zone, which were not frequent and were usually arranged in pairs. The secretion was also examined in the hanging drop, both stained and unstained.

We investigated with particular attention the cor-

puscular cells of Leber. The stain of the hanging drop was gentian violet. It seemed clear to us that these corpuscular cells were not phagocytes, because these cells always contained the nucleus of an epithelial cell and clearly must be derived from epithelium. From analogy with the giant-cells in tuberculosis, it seemed probable that these cells must contain the cause of trachoma. Occasionally we found in the contents of these corpuscular cells (oil immersion and .ocular 8) just visible diplococci. Other specimens were stained with methylin blue, anilin gentian violet, after the Gram method, but no additional results were obtained. The various modifications of the tubercle stain were also employed and the minute diplococci were also demonstrable by this method. The contents of the follicles were also examined bacteriologically.

It is important in trachoma to differentiate between the fundamental disease and the associated catarrhs. There are occasional true cases of trachoma with very few characteristic symptoms. It seemed to us of importance to avoid all the inflammatory conditions which might be situated on the surface. We were enabled to study a recent case of trachoma from East Prussia, with practically no inflammatory symptoms but with well-marked deeply situated follicles. A single follicle was carefully excised and its contents spread upon a cover-glass. Most of these specimens were free from bacteria, although a few showed the small diplococci.

We were enabled to continue this investigation in Posen, and in addition to these methods just described we also examined the secretion and the follicle contents with the spirochæta stain. With the Gram stain, notwithstanding the numerous disturbing precipitates, these very small double bacteria could be recognized. There were no spirochætæ. Levaditi's method proved to be unpractical on account of precipitates. Romanowsky's method has not been of any advantage.

Cultural experiments were also undertaken, the discharge being implanted on a great variety of culture-media, but never was there a growth of anything beyond the ordinary well-known bacteria. The contents of the follicles were also planted on culture media, but they remained sterile.

We may then conclude that in numerous cases of trachoma an almost constant condition is, that in the discharge and in the follicle contents these very small diplo-bacteria can be distinctly seen on strong magnification (Zeiss apochrom. 2*mm*, ocular 8). With a magnification of 2000 they seemed to be round, occasionally like small double bacilli. They are always surrounded by a zone, and occur either isolated or grouped together in the cells next to the nucleus.

Halberstädter and Prowazek have reported the presence of similar inclusions consisting of very delicate granulations which were situated in the protoplasm next to the nucleus of the epithelial cells derived from the conjunctiva, in certain persons suffering from trachoma and in infected orang-outangs in Java. These granulations appeared dark blue with Gram. In addition they found very small granulations which occasionally occupied a large part of the protoplasm.

We have repeated the investigations of these authors and must confirm their findings. The authors on their return from Java examined our specimens and regard these organisms as identical with those which they discovered in Java. Control examinations of normal conjunctiva and in follicular catarrh were always negative. We further found that these small bodies not only stain according to Giemsa, but also with dilute carbolfuchsin and methylin blue, but not after Gram. Prowazek states that he has not been able to find these structures in the interior of the follicles nor in the older cases. We, however, found our organisms principally in the follicles and in the discharge from well-marked cases.

INOCULATION. OTHER GRANULAR FINDINGS.

The investigation of the etiology is exceedingly difficult because animal experimentation has not been successful.

A. Inoculation of Man.

We have transferred to the normal human conjunctiva in two cases material from trachomatous eyes. This has not been done without the knowledge of the patient, but the healthy patients have been perfectly conscious of the possibility of infection and have willingly consented, on payment, to offer themselves in the interest of science.

1. W., forty-two years old. Has never had any disease of the eyes. Conjunctiva pale, anæmic. The inoculation took place from a boy 13 years old, suffering from trachoma, who has been treated. His eyes have been red and swollen for several months and there is a certain amount of discharge. There are numerous, not very large nor particularly deeply-seated, follicles in the conjunctiva. Bacteriological examination negative. Our trachoma granules were not found. Diagnosis: Trachoma (?).

On June 5, 1907, some of the follicle contents and epithelium of the conjunctiva were removed with a roller forceps and part of this was transferred to the healthy conjunctiva. This was followed by moderate rubbing of the eyelids.

The experiment resulted negative. The conjunctiva of the inoculated person remained pale and no follicles developed. This case is of some interest in that it may possibly show that the time of infection had passed. That the case was at one time contagious is likely because two other children in the same family suffered with the trouble. A number of practical observations have suggested to me that though the clinical picture of trachoma may exist for a long time, it loses its infective power.

2. S., twenty-two years old. The conjunctiva is normal. Before inoculating, some of the epithelium of the left eyelid is

scraped off and stained after Giemsa. No cell inclusion is found.

Inoculation June 6, 1901, from a boy with undoubted trachoma. The characteristic granules, which we will henceforth call trachoma granules, were present in the discharge and in the epithelium. Some of the conjunctival surface is scratched off with a platinum needle and transferred to the conjunctiva of the subject. This was followed by swelling of the lids, redness, and discharge. Ten days after the inoculatian the fornices were swollen and distinct follicles were present. In brief this case developed a typical severe trachoma with all the characteristic lesions even more quickly than Addario's cases (Italian Congress for Trachoma, 1906).

This successful experiment shows beyond question that trachoma is surely contagious, a fact which in recent years has been doubted. The supposition of a local predisposition is doubtful. As opposed to the general assumption, there is an acute trachoma which develops in a few days.

Microscopical examination showed trachoma granules present on the 13th day after inoculation.

B. Inoculation of Animals.

1. On rabbits and guinea-pigs.

Our experiments with guinea-pigs and rabbits have always remained negative. There never was anything more than a simple catarrh.

Thinking that in order to have a successful inoculation it is necessary that the conjunctiva is more or less irritated, we continued our experiments in the eyes of animals which had been irritated for a number of days by snuff, sand, and dust, but even in these cases, beyond the traumatic conjunctivitis, nothing resulted. We made pockets in the cornea and introduced trachomatous material again without result.

2.—On dogs.

I remember ten years ago in East Prussia to have

observed a large house dog with gelatinous trachoma. Dr. Kunz tells me that he has treated a dog that lived for many years in the trachoma barracks in Thorn. In both eyes unusually thick trachoma follicles were present. Our experiments on dogs, however, were not successful.

3.—On lower apes.

The lower apes (macacus) were inoculated, partly in normal conjunctiva, partly after being irritated. In other cases an emulsion was introduced under the conjunctiva. The inoculations were repeated. We obtained only negative results as in the other cases.

4. On anthropomorphic apes.

The results on anthropomorphic apes were different and also differed from man.

Halberstädter and Prowazek have succeeded in infecting orang-outangs with trachoma successfully in Java. After an incubation period of seven days in the orang-outang there is moderate redness and swelling of the palpebral conjunctiva with some secretion. The epithelium at this time on examination shows the microscopic cell inclusions. In no animal were there symptoms which resemble clinically human trachoma.

Hess and Römer have transferred trachoma to pavians. In some of these animals clinical pictures were observed which presented some anatomical and clinical resemblance to trachoma. They were further able to transmit the infection from one pavian to another.

In the Ophthalmological Congress of this year, A. Leber reported positive results in transmitting trachoma to monkeys.

We have inoculated a pavian successfully. The patient who furnished the inoculating material presented the parasites in the epithelial cells and discharge. The report is as follows:

A. C., twenty-five years old. His right eye is normal; his left eye has been inflamed for two weeks. The upper lid of

the left eye is red, there is some tearing and discharge. The conjunctiva is swollen and red and covered with deep-seated grayish follicles. A number of specimens were prepared from the secretion, also a number of epithelial cells were examined. In these secretions there are numerous epithelial cells which contain the typical granules. The discharge from this patient's eyelids was transmitted to one eye without causing any trachoma; in the other eye, after injury to the epithelium, a rather marked purulent conjunctivitis developed. The conjunctiva was quite red, but there were no follicles to be seen. Examination both of the secretion and of the epithelium demonstrated the presence of the granules very much more in the left than in the right eye.

This seems to prove that in the anthropomorphic monkey, in contradistinction to other animals, the trachoma virus takes and develops. As in our experiment with man, the clinical picture developed in a few days. The picture, however, is entirely different from man. We were able to produce only a purulent conjunctivitis, the large gray follicles which are regarded as characteristic of trachoma being absent. Halberstädter and Prowazek came to the same conclusion in Java. Hess and Römer were more fortunate.

It seems reasonable to say that the conjunctiva in anthropomorphic monkeys reacts to the virus of trachoma, but its development and the clinical picture vary when compared to the human. Perhaps the infection is analogous with syphilis, to which the human is so susceptible and animals appear much less so.

Within a short time an extensive paper will appear by Dr. Clausen on these characteristic cell-inclusions, where the results of the examination in cases of trachoma and the control examinations in other forms of conjunctivitis will be considered.

It seems to us that we have been able to observe all the developmental phases of this parasite from the period in which it appears scattered in the discharge, or as a

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

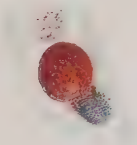
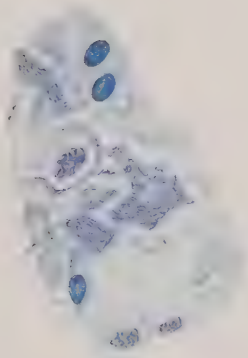


Fig. 5.

Fig. 6.



Greeff, Frosch und Clausen, Trachom.

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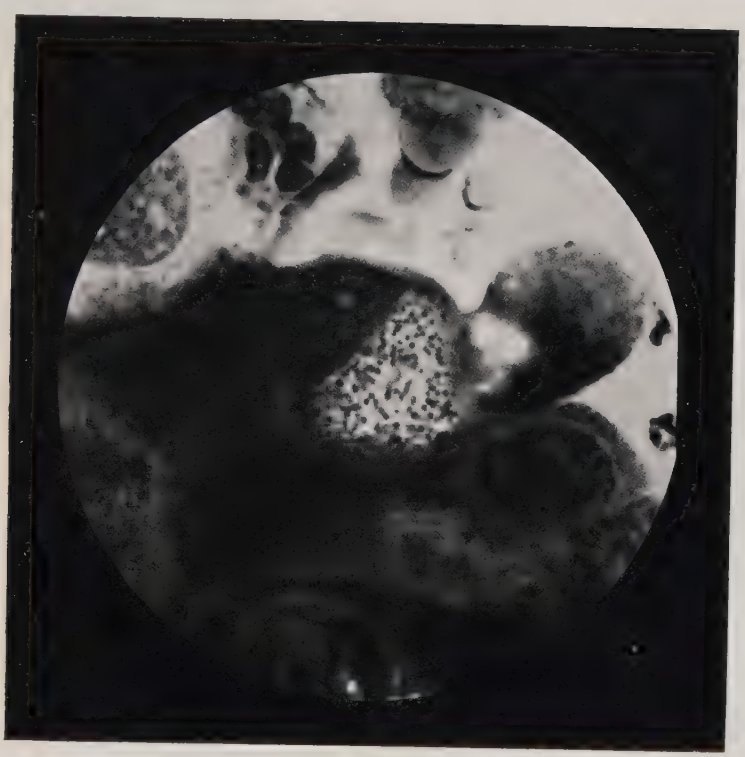

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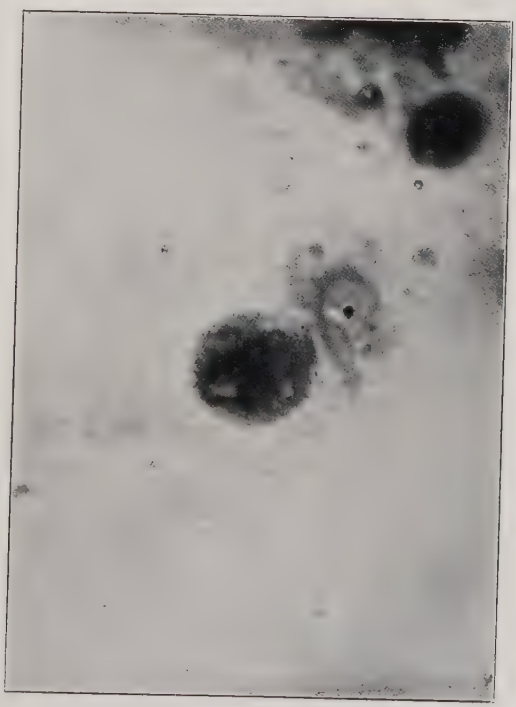

Fig. 8.

Greeff, Frosch und Clausen, Trachom.

Kgl. Univ.-Druck. von H. Stürtz, Würzburg.

Verlag von J. F. Bergmann in Wiesbaden.

single granule in the cells—more apt to be grouped in pairs, as we observed in our first publication—up to the stage where they appear as more or less enclosed groups of granules in the cells.

The original form is indefinite. The attempt of Prowazek to give a zoölogic definition to these structures is interesting. It is, however, questionable whether the grouped form is the individual, or whether it is not more likely to be an assembly of the small bacterial parasites such as we have seen and observed. We, therefore, are not inclined to accept his view, but would rather retain our previously suggested term, trachoma granules.

Lastly it must be stated that our report on the etiology of trachoma does not make any claim to an exhaustive study of the literature, and it has seemed to us too early in our investigations to critically review the publications on this subject.

DESCRIPTION OF PLATES XII. AND XIII.

PLATE XII.

Figs. 1 and 2. Follicle-contents, hanging drop specimen stained with gentian violet. So-called corpuscular cells with nucleus and nucleolus, many protoplasm inclusions and double granules. Enlargement 1: 1000.

Figs. 3 and 4. Epithelial cell inclusions stained with methylin-blue (3), after Giemsa (4). 1: 1000.

Fig. 5. Diplobacteria in conjunctival discharge (trachoma) stained with methylin-blue 1: 1000.

Fig. 6. Diplobacteria in trachoma follicle contents, methylin-blue.

PLATE XIII.

Fig. 7. Microphotograph 1: 2000 enlargement. One body in epithelial cell.

Fig. 8. Microphotograph. Trachoma follicle contents, showing diplobacteria.

ON GUMMATOUS TUMORS OF THE SCLERA.*

By Dr. A. W. LOTIN.

Abridged Translation from the German Edition, Vol. L., No. 3, August, 1904, by Dr. Ward A. Holden.

GUMMATOUS new growths of the sclera are so rare that Cohn failed to see a single case among 20,000 patients, and most of the text-books devote little or no space to their description. Michel in his text-book gives the subject more attention. In speaking of the etiological factors that may cause scleritis or episcleritis he mentions syphilis and tuberculosis, but believes that in these cases it is not really scleritis but rather infectious granulomata which represent gummatous or tuberculous foci. These he says may develop primarily in the sclera, but often begin in the anterior portion of the uveal tract and invade the sclera secondarily. Mandelstamm says: "Sypilitic episcleritis or scleritis appears at times in the form of a gumma. Eight cases have been reported." No microscopic examination of a pure case seems to have been made.

So far as I am familiar with the literature, sixteen cases of gumma of the sclera have been described, three others have been alluded to, and the total number is twenty-one if one includes the cases of von Hippel and Fialho in which the scleral affection was but a part of the syphilitic disease of the entire eye. Thus one sees that in fact gummatous

* From the Laboratory of the St. Petersburg Academic Eye Clinic, Prof. Belljarminoff.

tumors of the sclera are very rare, and it has seemed to me worth while to describe in detail the case I observed and to give a *résumé* of the literature.

The patient, a man of forty-three, stated that he had felt pain in the right eye four years before; this extended to the face and anterior half of the head and vision rapidly decreased, being lost entirely in less than a month. The pain continued with brief remissions up to the time of examination and had been particularly severe in the last six months. R V=o. The eye presented the changes found in the glaucomatous stage of intraocular tumors. No red reflex could be obtained from the interior.

June 14, 1902, the ball was enucleated.

June 22d, wound healed, patient discharged.

The enucleated eye exhibited a white tumor arising about 7*mm* from the corneal margin and extending round the eye in an equatorial direction. The tumor was elevated about 5*mm* in the upper portion of the eyeball and scarcely at all below. After being divided by sagittal section it was seen that the tumor arose from the sclera, surrounded the entire posterior portion of the eyeball, and had extended both externally and internally. The greatest thickness of the tumor was at the equator; in the upper part the tumor was 9*mm* thick, and in the lower 5*mm*. The anterior chamber was shallow and the retina completely detached.

The ball was hardened in alcohol and imbedded in celloidin. Total sections were stained with Boehmer's hematoxylin and eosin and by van Gieson's method and also with carbol-fuchsin for tubercle bacilli.

The tumor was found to consist in its entire extent chiefly of fibrous tissue which in the central portions of the tumor had undergone hyaline degeneration. In the areas of hyaline degeneration the connective-tissue cells were preserved in part and in part they were necrotic. Here and there were areas of calcification. A few elastic fibres were revealed by Weigert's method. Particularly noteworthy were focal infiltrations of the tissues with round cells. These cells lay in part in tracts along the fibres, but for the most part they were collected into groups which suggested lymph nodules.

In the stained preparations these nodules were visible to the naked eye as scattered dark points as large as a pin-head. They consisted chiefly of small round cells, lymphocytes, and of small plasma cells, as well as of epithelioid elements and isolated mast cells. Here and there within and without the groups of cells were typical great giant-cells with a number of nuclei regularly arranged about the periphery of the cell.

Some groups of cells exhibited evidences of necrotic changes in their centres, the nuclei in some cells staining but faintly and in others not at all, and the outlines of the cells were not sharp. Here and there only a granular detritus remained. These caseous foci were few in number and formed but a small portion of the tumor as compared with the hyaline degeneration and necrosis of the old connective tissue in the central portion of the tumor. A few small arteries in the tumor exhibited the characteristic picture of an endo-, meso-, and peri-arteritis. At the insertion of the superior rectus which sinks into the tumor there were signs of myositis, the muscle fibres being separated partly by cellular infiltrations and partly by dense connective tissue which had undergone hyaline degeneration.

In general the outer layers of the tumor are chiefly composed of young connective tissue infiltrated with leucocytes and the inner layers of old connective tissue with hyaline and caseous degeneration.

In respect to the other coats of the eye, it should be said that the upper margin of the cornea was vascular, infiltrated with leucocytes, and bulging. The entire choroid was densely infiltrated with leucocytes, while in the ciliary body and iris the round cells had developed into new connective tissue. The small vessels of the iris were plugged by endarteritic changes.

In the anterior chamber and beneath the detached retina near the posterior pole of the eye were masses of broken-down red blood corpuscles from former hemorrhages.

The structure of the tumor, an infectious granuloma, proves it to be either tuberculous or syphilitic. The absence of tubercle bacilli and the condition of the vessels make it quite certain that it is not tuberculous. The

tumor therefore is to be considered an indurated syphilitic granuloma of the sclera, with disseminated miliary gummata and hyaline degeneration in the tissues surrounding the gummata.

Cases of gummatous tumors of the sclera have been reported by Bull[10], Hirschberg[11], Rothmund and Eversbusch[12] (2 cases), Andrews[15], Saint-Martin[16], Tessler[17], Alexander[18], Wadzinski[19], Tornawski[20], Kyle[21], Engel-Reimers[22], Motschulski[23], and Filatow[24]. Of all these cases the one nearest resembling mine is the second case reported by Higgins[14], in which a gumma of the sclera detached the retina and caused blindness.

A *résumé* of this case follows:

The patient, aged twenty-seven, came to Guy's Hospital, June 2, 1882, with an affection of the right eye and evidences of tertiary syphilis. The primary infection had occurred two years before, and four months before the right eye became swollen and vision decreased until now there was complete blindness. A large red tumor extended from the outer corneal margin to the equator of the eye. The overlying conjunctiva was markedly injected. The retina was detached at the site of the external tumor and a yellow reflex was here obtained with the ophthalmoscope. In the vitreous were dark floating opacities. Under mixed treatment the tumor decreased up to July 21st. On August 4th an ulcer of the cornea appeared, and after the use of belladonna compresses on August 10th it had healed. At this time the tumor increased in size again. On August 30th the tumor was found to have disappeared leaving only a red spot. The retina remained detached as before. The eye decreased in size and was quite blind.

This case was one of solitary gumma involving both the outer and inner surfaces of the sclera, extending into the interior of the eye and detaching the retina for a considerable extent.

This is all that I have been able to find in regard to gummata or gummatous new formations in the sclera. I have not mentioned two cases of episcleral gumma

which Demicheri[25] has described, or two observed by Fromaget[26], or the cases reported by other authors which Fromaget has collected in his paper, since in these cases apparently the episcleral or conjunctival tissues were affected but not the sclera itself. So far as I could make out among the reports by de Wecker[27], Estlander[28], Brière[29], Andrews[15], Minor[4], Saint-Martin[16], Campart[30], Le Roy Pope Walker[31], Caudron[32], Galezowski[33], Wadzinski[19], only the cases previously mentioned, reported by Andrews[15], Saint-Martin[16], and Wadzinski[19], were described as scleral gummata. It is of course difficult to distinguish sharply between episcleral and scleral gummata, and among the doubtful cases are those of Motschulski[23], Caudron[32], and Campart[30]. Furthermore, from an anatomical standpoint scleral gummata cannot be sharply distinguished from cases of syphilitic scleritis since the latter may be in fact syphilitic granulomata. This view was held by Prof. Belljarminoff when he discussed my paper before the St. Petersburg Ophthalmological Society.

In order to complete the bibliography I shall cite the cases of v. Hippel[34] and Fialho[35], in which the sclera was involved in the general syphilitic affection of the entire eye, which in both cases was enucleated and examined.

In v. Hippel's case one saw in sections of the eyeball a tumor arising from the ciliary body, chiefly occupying the lower-inner quadrant of the ball and extending into the iris and choroid. The sclera was greatly thickened over the affected portion of the choroid, projected in a nodule into the interior of the eye, and was more closely connected with the choroid than is normally the case. Microscopic examination revealed a lymphoid- and epithelioid-celled infiltration of the iris, ciliary body, and choroid, and a lymphoid-celled infiltration of the sclera and cornea.

Fiahlo's[35] patient was a man of twenty-six with secondary symptoms, in whom the affection appeared in the form of a bilateral iridocyclitis. Notwithstanding antisyphilitic treat-

ment the left eye was lost and became so painful that enucleation was necessary. Microscopically there was found an inflammatory infiltration of the iris, ciliary body, conjunctiva, and sclera. In the choroid there were nodular infiltrations separated by lymphoid elements and composed of epithelioid elements and giant-cells, but there was no caseous degeneration and tubercle bacilli were not found.

As was stated above, microscopic examinations of gummata of the sclera have not hitherto been made.

Some similarity with the microscopic picture of my case is offered by the severe forms of deep scleral inflammation which Schlodtmann[36] has called "gelatinous infiltration of the sclera." This form of inflammation has been described by Friedland[37] and Uhthoff[38] also, who differentiate it from the other forms of scleral inflammation.

In all these six cases the patient was between sixty-four and seventy-five years of age; the affection was marked by a protracted course, and it caused severe pain in the eye and head, and usually led to blindness. The episcleritis and scleritis occupied the anterior half of the eye, extending back to the equator. It was distinguished by its brownish-red hue and the gelatinous appearance of the entire anterior half of the eye and opacity of the periphery of the cornea in its deeper layers. The microscopic examinations of the enucleated eyes made by Schlodtmann, Friedland, and Uhthoff revealed a marked infiltration of the episcleral tissues, of the sclera, and of the ciliary body and anterior portion of the choroid and periphery of the cornea, with mononuclear and some polynuclear leucocytes; and besides this infiltration there was a marked dilatation and increase in the number of the subconjunctival and episcleral blood- and lymph-vessels —all contributing to give the eye a gelatinous, œdematous appearance. The infiltrating cells in the sclera formed extensive groups for the most part, but also appeared in the form of tracts and isolated foci.

These cases were not exactly similar as regards microscopic appearances, there being small points of difference. Etiologically all these cases are unexplained. Syphilis and tuberculosis could be excluded. Schlodtmann regarded them as of mycotic origin, caused by some micro-organism.

Although, as stated above, the microscopic picture in cases of deep scleritis is similar to that in my case in many respects, such as the extensive infiltration of the sclera, choroid, and ciliary body with leucocytes, and the presence of giant-cells and necrotic foci (Schlodtmann, Friedland), nevertheless there are differences as follows:

1. In the cases of Schlodtmann, Friedland, and Uhthoff the process occurred in the anterior half of the eye, and was most marked at the limbus of the cornea, while in my case the posterior half of the eye was chiefly affected and the process had reached its highest development near the equator.

2. The authors cited give, as the characteristic sign of their cases of deep scleritis, the dilatation and proliferation of subconjunctival and episcleral blood- and lymph-vessels, which in my case were wanting.

3. The necrotic focus found in the sclera by Friedland showed no signs of caseous degeneration, while this was found in my case.

4. Finally, in the cases of Schlodtmann, Friedland, and Uhthoff neither sclerosis nor hyaline degeneration was found, while these were present in my case.

Since we have not at our disposal any reports of microscopic examination of gummatous tumors of the sclera, I will give a short report of the "epibulbar syphilitic tumor" of the conjunctiva accurately described and microscopically examined by Peppmüller[9].

The flat, nodular, reddish-yellow, hard tumor adherent to the eyeball occupied nearly the entire nasal half of the bulbar conjunctiva and extended into the upper lid. Two similar smaller nodules lay in the temporal half.

The eye was not irritated and there was no injection in the uninvolved parts. At the same time ulcers and scars were found on the right arm and the breast and a retropharyngeal tumor appeared. The epibulbar tumor disappeared after two weeks of mixed treatment, and the other symptoms after four weeks.

Microscopic examination of bits of the epibulbar tumor and of the ulcer on the arm revealed a picture which caused a pathological diagnosis of tuberculosis. In a granulation tissue rich in cells and poor in vessels were numerous giant-cells of the Langhans type; at many points pronounced necrosis, sometimes proceeding from giant-cells that have undergone caseation and oftener without tubercle arrangement. Besides these there were numbers of sharply differentiated tubercle nodules composed of epithelioid and lymphoid cells, with a reticulum, giant-cells, and caseation in the interior but not always central. The giant-cells lay partly in the nodules and partly about them.

The anamnesis and the results of treatment proved that the disease was syphilitic and tuberculosis was further excluded by the facts that the injection of Koch's tuberculin led to no reaction, that the introduction of a bit of the tumor into the eye of a rabbit caused no reaction, and that no tubercle bacilli were found in the tumor.

I have described this case of syphilitic epibulbar tumor because its microscopic appearance resembled that of some regions in my tumor.

In conclusion I would repeat that gummatous tumors of the sclera are very rare and in the beginning, when other evidences of syphilis are wanting, very difficult to diagnose.

Usually they appear in number from one to three, of various sizes, projecting from the surface of the sclera, but occasionally presenting in the interior of the eye. They are round or egg-shaped, are not movable over the

sclera; the overlying conjunctiva is violet-red. They lie often at the corneal margin and usually anterior to the equator. There is injection of the neighboring scleral, episcleral, and conjunctival vessels and sometimes of all the vessels of the eye. In some cases the tumors are not sensitive, in others there is pain in the eye and sometimes in the head. In all probability the pain is due to simultaneous affections of the uveal tract. When the gumma lies near the margin of the cornea it may cause cloudiness of the adjacent portion of the cornea. Among the complications that have been noted are iritis, retinitis, and opacity of the vitreous.

In some cases there may be perforation or staphyloma of the sclera or the formation of distorting scars. In case of penetration into the interior of the eye, detachment of the retina may result or even atrophy of the ball. If energetic antisyphilitic treatment is begun early gummata of the sclera may disappear without leaving any signs of their previous existence.

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ABSTRACTS OF ARTICLES IN VOL. XLVII., GERMAN EDITION, 1903, NOT PREVIOUSLY TRANSLATED.

By Dr. ALFRED BRAUN, New York.

I.

SOME REMARKS ON RAUDNITZ'S COMMUNICATION CONCERNING EXPERIMENTAL NYSTAGMUS.

By Prof. A. PETERS, Rostock.

Raudnitz propounded a new theory, in 1895, to explain spasmus nutans, the gist of which was, that dark rooms forced children to direct the sight in abnormal directions, thus giving rise to reflex spasmodic contractions of the head muscles. This is accompanied by nystagmus, which is analogous to the nystagmus of miners.

This was proven by the following experiment: Two young dogs were placed in a dark cage, while two other dogs, of the same brood, were allowed to remain at large, to be used as controls. After 61 days both the dogs which were kept in the dark showed nystagmus. One of the dogs was now brought out into the light. After 19 days, the nystagmus disappeared, to reappear again when he was replaced in the dark cage. This was repeated several times, always with the same result. A third, somewhat older dog, when placed under similar conditions, did not develop nystagmus, showing that in order for the experiment to be successful it is essential that certain tracts should not yet have formed, and that, as a result of the lack of power of orientation, they cannot develop.

By these experiments, Raudnitz believes that he has disproven Peters's hypothesis, that miners' nystagmus is due to abnormal distribution of the endolymph.

The experiments, however, in the author's opinion, merely prove that in this particular instance, the vestibular apparatus was not the etiological factor. They do not prove that in miners' nystagmus, the vestibule is not at fault.

The experiments show that an injury to the peripheral and central visual apparatus, at a period when the central tracts are not yet fully formed, may cause nystagmus. The determining factor of the nystagmus in these cases is the lack of regulating visual impressions, as is the case in nystagmus due to amblyopia occurring in the early years of life. In spasmus nutans, and in the miners' nystagmus, however, there is no loss of regulating visual impressions.

III.

A CASE OF PARTIAL BILATERAL IRIDEREMIA.

By Dr. G. HIRSCH, Halberstadt.

The patient, 59 years of age, consulted the author for a distichiasis, slight senile ectropion, and presbyopia.

The iris is bluish gray, and the markings are sharp and distinct. The pupil of the right eye is pear-shaped, with the point directed upward and outward. The pupil of the left eye is larger, and circular, except for a small nick in its lower-inner circumference. The sphincter markings are lacking in the upper-outer part of the right iris, and entirely, in the left iris. The right pupil reacts slightly, to light and convergence. The left pupil is immobile. There is no interference with vision.

IV.

A CASE OF SARCOMA IN AN ATROPHIC EYE.

By Dr. A. BIELSKY, Moscow.

Sarcomata may occur in atrophic eyes in two ways: 5–7 cases have been reported where a sarcoma takes origin in an eye which is atrophic as a result of an inflammatory process

of the uveal tract. About 43 cases have been reported of sarcoma occurring in a normal eye, which became atrophic secondarily.

Opinions as to the cause of the secondary atrophy vary. Von Graefe believes that the tumor gives rise to glaucoma, which results in disturbances of the trophic nerves of the cornea, and breaking down of the cornea, followed by panophthalmitis, and phthisis bulbi. Fuchs believes the atrophy to be due to an irido-chorioiditis caused by the sarcoma.

Evetzky and Leber-Krahnstöver showed that in all cases the entire tumor was necrotic and surrounded by a capsule rich in cells. Evetzky believes this capsule to be a portion of the tumor, which has escaped the necrotic process. According to Leber-Krahnstöver, it is a reaction zone which contains large phagocytes. The latter authors believe the atrophy to occur as follows: The width of the vessels, the irregularity of their walls, and the slowness of the blood-current predispose to the lodging of micro-organisms in the tumor, thus resulting in the endogenous infection. Evetzky believes that the necrosis of the tumor results in transportation of the products of necrosis into the neighboring portions of the globe, resulting in inflammation, followed by atrophy.

Mrs. Th. M., 34 years of age, came to the Moscow eye clinic, on Sept. 4, 1900. She complained of pain, and complete blindness in the left eye.

Left eye is somewhat smaller than right; circumcorneal injection, and diffuse cloudiness of cornea. Pupil dilated and immobile. An undecided yellowish reflex is seen in background. Fundus cannot be seen. T. —.

Blindness came on suddenly, in May, accompanied by severe pain.

Evetzky suspected an intrabulbar tumor to be the result of the cyclitis and bulbar atrophy, and enucleated the eye, on October 7th.

Macroscopic Appearance.—Sagittal diameter is 17*mm.* Transverse diameter is 19*mm.* The sclera is wrinkled, and varies in thickness in different parts.

The lens is cloudy, and lies immediately behind the cornea. The free border of the iris is reduplicated upon itself in one part, and in another portion, it is very thin, and lies on the

anterior surface of the lens. The ciliary body is thickened and partially detached from the sclera. The uvea is thickened in places, and attached to the sclera. The entire space behind the lens is filled in by a dark grayish-white mass, with a dark border. It is somewhat granular. Near the optic nerve, there is a small fibrous thread, the pedicle of the tumor, which passes into the chorioid. The retina is detached, and lies on the surface of the tumor.

Microscopic Appearance.—The cornea is flattened, somewhat thickened, and its posterior surface contains numerous small folds. There is an increase in leucocytes. There is no anterior chamber. The iris is thickened and attached to the anterior lens capsule. The anterior lens capsule is covered by a layer of fibrous tissue. The ciliary body is hyperæmic and infiltrated. It contains hemorrhages. It is covered by connective tissue which fills in the entire perilenticular space. The lens is broken down. The chorioid is thickened and one cannot make out distinctly its component layers.

The tumor fills the entire globe, touching the posterior pole of the lens. The sides and base of the tumor are covered by a pigmented capsule. This is lacking on the top of the mass. The thickness of the capsule is 0.25–1.5*mm.* The tumor itself appears as a homogeneous necrotic mass, containing irregular masses of brown pigment. There are a few leucocytes, a few blood-vessels with degenerated walls, and some irregular cavities.

The pigmented capsule represents sarcomatous chorioid, consisting of pigmented and non-pigmented, round and spindle-shaped sarcoma cells.

V.

CONCERNING TRUE PAPILLÆ IN THE NORMAL CONJUNCTIVA.

By Dr. JINSEN NAKAGAWA, Japan.

Irregularities of the surface of the conjunctiva have long been noticed. It took some time, however, to discover that these irregularities are of two kinds, papillary hypertrophies and follicles. The names of both of these varieties of irregu-

larities were unhappily chosen. The term granulations, as applied to follicles, is especially misleading. It was formerly thought that these irregularities were similar to the granulations of an ordinary wound and were not covered by epithelium. It is now known that they consist of lymphatic hypertrophies under the epithelium, which are the result of certain forms of irritation of the conjunctiva.

But, although there is now a unanimity of opinion as to the character of follicles, this is not the case with papillary hypertrophies. In various forms of conjunctivitis, we see a velvety condition of the conjunctiva. This appearance is due to slight irregularities of the surface, which were formerly thought to be due to an hypertrophy of the papillary layer of the conjunctiva. It is now known, however, to be due to an irregular thickening of the adenoid layer of the conjunctiva resulting in a throwing of the epithelium into elevations and depressions. These irregularities cannot be considered as papillæ. The papillæ of the skin consist of irregular elevations under the epithelium, the irregularities being evened out by the overlying epithelium, so that the surface of the epithelium is smooth.

In contradistinction to these false papillæ, there do occur true papillæ in the normal conjunctiva. Villard and Greeff mention the occurrence of true papillæ in the conjunctiva, near the corneal margin.

In order to study these true papillæ, the author examined numerous conjunctivæ of man and the domestic animals. It was found that the palpebral conjunctiva and the fornices contained no papillæ. But in the neighborhood of the cornea, numerous papillæ were found. In the horse's eye, 5–7 papillæ were found in an area 1.5 to 3*mm* from the limbus in every direction. In the ox's eye, the papillæ are more numerous.

The papillæ are, on the average, 120μ high, and 80μ wide. They are largest in man. They consist of a dense superficial portion, containing few nuclei, and a central portion, consisting of loose connective tissue. Into the central portion of each papilla, a vessel passes from the underlying tissue, just as in the papillæ of the skin, or chorionic villi. The vessels take origin from the deep

corneo-scleral ring of vessels. The valleys between the papillæ are filled in by epithelium, so that the surface of the epithelium is smooth. This is termed the levelling function of the epithelium.

It is of interest that in old people these papillæ become larger and subdivide. Perhaps this may explain the predilection of this region for carcinomata. In a beginning carcinoma of the sclero-corneal junction, these papillæ hypertrophy enormously, and burrow into the depths.

VI.

ON THE DIAGNOSIS AND TREATMENT OF RETRO-BULBAR AFFECTIONS.

By Dr. E. FRANKE, Hamburg.

In the last year, the author saw two cases of double perforation of the eyeball, by a foreign body. In many cases, it is difficult to decide whether the foreign body is within the globe or in the orbit.

The first of the author's cases was a blacksmith, H. S., 20 years of age, into whose eye a splinter of iron flew. When he entered the hospital, a small wound was seen in the supra-nasal portion of the cornea near the limbus. A rusty chip of iron was seen in the iris, as well as a traumatic cataract. The eye was very red. There was slight hypopyon. The piece of iron in the iris was removed with iridectomy, followed by extraction of the lens. Some rust-colored opacities were seen in the vitreous, extending from the point of entrance of the fragment in the iris to the papilla. On the papilla was seen a vertical, slit-like cicatrix, involving the lower half of the nerve, and the adjacent retina. An X-ray plate showed the fragment behind the eye.

The second case was that of a patient, into whose left eye a fragment of a hammer flew seven years before. He had, at that time, a rupture of the chorioid which healed without any diminution of vision. Seven years after the injury when first seen by the author, when the eye was turned to the extreme nasal side, a white spot was seen, which looked like a cicatrix following a perforating wound. In the upper nasal portion of the fundus a light patch was seen, and below and

outward, near the papilla, a white circular cicatrix resembling a healed rupture of the chorioid. The author suspected a double perforation of the globe, although the history spoke against it. An X-ray picture showed a foreign body in the back part of the orbit.

The value of X-ray pictures in detecting large and small foreign bodies in the orbit is very great.

It is not always possible to tell whether the fragment is in the posterior portion of the sclera, or in the optic-nerve sheath. If X-ray pictures are taken, with the eye looking in different directions, and the foreign body is found in different positions, we have to deal with a foreign body in the eyeball, or in the anterior part of the nerve, or its sheath. If the shadow of the object is always in the same place, the foreign body is in the orbit.

In a few cases, the X-ray has been used to determine the presence of retrobulbar tumors.

The author made the diagnosis of retrobulbar tumor by means of the X-ray in two cases. In one, the diagnosis could be made, even without the aid of the X-ray. In the other, the diagnosis was not so easy.

T. B., 32 years of age, was struck on the back of the head by a piece of iron, eight months before. He suffered from dizziness and headache, since that time. The right eye gradually became blind. When seen by the author, the right eye had no perception of light. Fundus normal, except for slight pallor of the disc. The eye turns out, and is displaced downward and forward. Mobility is limited slightly outward and downward. An X-ray picture, taken by Dr. Albers-Schoenberg, showed a large part of the orbit occupied by a shadow, extending into the front sinus. The suture between the malar bone and the malar process of the frontal bone was separated.

It is not so very long ago that, in cases of retrobulbar tumors, it was thought necessary to remove the eye, even when the sight was good.

In the Heidelberg Ophthalmological meeting, in 1874, Knapp described a method of removing retrobulbar tumors, without sacrificing the eye. After separation of the bulbar conjunctiva one or more muscles were separated at their insertion to the

sclera, and, by rotating the eyeball, the tumor was brought forward, and separated. This method was used successfully in many cases. But it has many drawbacks.

The method of Kroenlein possesses many advantages. Kroenlein first described the operation in 1886, in reporting the removal of a deep-seated dermoid of the orbit.

Jonnescu, and Parinaud and Roche have modified the incision. The former uses a rectangular instead of the arched incision, the short arm running along the outer orbital margin. The latter, in order to avoid a disfiguring scar, have placed the end of the flap within the hair line, in the temporal region, the two horizontal incisions running to the brow and lower lid.

In order to replace Kroenlein's operation, temporary resections of other of the orbital walls have been advised. In 1897, Cohen recommended resection of the orbital roof, after temporary resection of the frontal bone, and pushing back the dura and brain. Gussenbauer described two methods in 1895 to reach the orbit and accessory sinuses by means of a temporary resection of the nasal bones.

In some cases orbital tumors may be removed without a bone resection. The outer commissure may be split, the external rectus divided, and the globe turned inward, after Lagrange; or after making a skin incision according to Kroenlein, a longitudinal incision may be made into the orbit just below and parallel to the supraorbital margin.

The author employed the Kroenlein operation in five cases. He obtained primary union in all cases, without drainage. Three of the cases were retrobulbar tumors, one for a case of suspected orbital tumor, and one for a foreign body in the orbit. The best results are obtained in tumors that are external to, above, or below the ocular muscles.

In a few cases, the operation was employed for orbital cellulitis, although, usually, simpler means suffice. In cases of pulsating exophthalmos, due to varicose orbital veins, and aneurysms within the orbit, the operation is of value.

In some cases, after removal of a retrobulbar tumor by means of a Kroenlein operation, there follows an enophthalmos due to cicatricial contraction. Disturbances of motility may follow, in cases where the muscles were injured. The ex-

ternal rectus is the muscle which suffers most. Some authors claim that when the periosteum is separated from the bone in the region of the external rectus, cicatrical adhesions form between the periosteum and muscle, thus restricting its function. In order to avoid this, the bone and periosteum may be cut through together, without separating periosteum from bone.

It is seldom necessary to divide the muscles. Retraction with a dull hook usually suffices. Some cases are followed by anæsthesia of the cornea and conjunctiva, and the area of skin supplied by the supraorbital nerve.

Some cases are followed by papillitis and changes in the retina.

VII.

"SUUM CUIQUE."

An Explanation, by Dr. E. HEGG.

In the author's paper on "A New Method for Measuring the Depth of the Anterior Chamber," he neglected to give credit for the following facts.

1. That the base of his stereoscopic ophthalmometer is modelled after that of the Zeiss corneal microscope of Dr. Czapski.

2. That the Porro prism system, as an aid in adjusting the distance between the oculars, to the distance between the eyes of the observer, was used in Czapski's corneal microscope.

3. That the principle of stereoscopy for measuring purposes, was already used in a "distance-measurer," made by Zeiss.

VIII.

CONCERNING DEPTH MEASUREMENTS BY MEANS OF STEREOSCOPIC VISION.

By Dr. S. CZAPSKI, Jena.

The author answers the explanations of Dr. Hegg, in his article, "Suum Cuique."

XI.

A CASE OF PRIMARY TUMOR OF THE LACHRYMAL GLAND.

A Contribution to the Study of Angeiosarcoma.

By Dr. ORLANDO PES, Turin.

Primary tumors of the lachrymal gland are very rare. Among those reported up to the present, sarcoma is the most important. Several cases of pure sarcoma have been reported, also lymphosarcoma, adenosarcoma, and angeiosarcoma.

C. R., 7½ months of age, was brought to the clinic, on Dec. 8th. The mother noticed a swelling of the left eye four months before, which was only noticeable after the child had been crying for some time. On examination, it was seen that the upper lid of the left eye was swollen under the eyebrow, with dilatation of the superficial veins. Slight ptosis. Eyeball displaced slightly downward and forward. Some limitation of motion upward. On everting the upper lid, the tumor appeared like a hernia coming out of the upper fornix. A diagnosis of orbital angeioma was made.

On Dec. 18th, an arched incision was made from the outer to the inner end of the upper lid, through the middle of the tarso-orbital fascia. The insertion of the levator palpebræ was divided. After incising the fascia, the tumor was seen lying along the upper-outer wall of the orbit, to which it was only slightly adherent. It extended backward, being attached behind by a broad pedicle to the periosteum, below the aponeurosis of the external rectus, to which it was adherent. The tumor was easily separated. It included the orbital lachrymal gland, showing the lobular structure of the latter. There has been no recurrence up to the present time.

Microscopic Examination.—Under moderate magnification, the sections showed that the general configuration of the lachrymal gland was preserved, showing a lobulated structure. In the centre is an elongated angeiomatous mass surrounded by an area of compact sclerotic fibrous tissue. In the interlobular connective tissue run numerous large vessels, from which the angeiomatous network takes its origin.

On examining the individual lobules, one sees a variety

of changes. The compact connective-tissue capsule which surrounds the central angeiomatous mass contains islands composed of densely packed cells, and also islands of angeiomatous tissue, with thickened vessel walls. The middle portion which forms a nucleus around which the lobules are arranged may be considered as the point of origin of the neoplasm.

The connective-tissue septa are dense in those portions of the gland occupied by neoplasm, and loose in those portions which are free from neoplasm.

Some of the lobules appear to be normal. In some, the glandular elements have disappeared, and are replaced by a system of vascular lacunæ. In some, there are mingled angeiomatous tissue, and more or less modified glandular tissue, and some are replaced by compact connective tissue. The vessels of the tumor and gland are dilated with thickened walls.

The central portion of the tumor is composed of intercommunicating lacunæ, surrounded by dense connective tissue and spindle cells, and lined by endothelial cells.

A proliferation of the cellular walls of the dilated capillaries and of the angeiomatous vessels occurs in the entire tumor mass.

It is thus seen that the picture presents the characteristics of our angeiosarcoma.

Kolaczek classifies angeiosarcomata under the benign neoplasms, on account of their slow growth, absence of metastases, lack of infiltration of glands, slight pain, and absence of cachexia.

Billroth considers them to be malignant on account of recurrences and involvement of the lymph glands. The author's case was certainly not malignant.

XIII and XIX.

THE VALUE OF IRIDECTOMY DEDUCED FROM A STUDY OF 1200 OPERATIONS.

By Dr. O. HALLAUER, Basle.

1. *Historical Portion.*—Woolhouse, in 1711, and Chessel-

don, in 1728, were the first to perform splitting of the iris, in cases of pupillary closure, following iritis. Sharp, Heuerman, Janin, and others, modified the procedure. Janin was the first to remove a portion of the iris, with scissors. Wenzel, in 1788, was the first to do a methodical iridectomy for optical purposes. He cut an iris flap with a cataract knife, and cut the flap off with a Daviel scissors, within the anterior chamber. This method was consequently only of value in aphakic eyes, or in eyes in which the lens was later to be removed.

Beer, in 1806, first performed a precorneal removal of the piece of iris tissue. In this way, the lens was not injured.

Von Graefe, in 1856, employed iridectomy for the cure of inflammatory conditions and to diminish increased intraocular pressure.

2. *Uses and Indications of Iridectomy.* The indications of iridectomy may be divided into three main classes.

1. To make an artificial pupil, for optical purposes.

2. As a purely therapeutic procedure, to reduce increased intraocular pressure and combat inflammations.

3. As a prophylactic procedure to diminish the dangers in operations in the anterior chamber, or to simplify the technique of other operations.

A.—OPTICAL IRIDECTOMY.

The opacities may be in the cornea, the pupil, or the lens. There may be opacities in the cornea, with or without an adherent iris. The pupil may be filled with exudate. The lens may be the seat of anterior capsular cataract, zonular cataract, or central secondary cataract.

Sixty-five to 87% of the cases, in which an optical iridectomy was done, showed an improvement in vision, but the improvement was in most cases very slight. The best results were obtained in young persons, on account of their greater adaptability.

Extraction is the principal operation for zonular cataract, and iridectomy is indicated only in the slight circumscribed central opacities, when atropin improves the vision considerably.

Optical iridectomy, performed on eyes, not the seat of an inflammatory process, usually runs an uneventful course.

The percentages of visual improvement, in the cases operated on in the author's clinic, are as follows:

In	*Improvement*	*No change*	*Diminished*
Leucoma simplex	85%	12%	3%
Leucoma adherens	81%	17%	2%
Pupillary exudate	65%	27%	8%
Keratitis and kerato-iritis	72%	28%	——
Zonular cataract	87%	13%	——
Congenital cataract	75%	25%	——
Secondary cataract	89%	11%	——

B.—ANTIPHLOGISTIC IRIDECTOMY.

In two out of the cases operated on for keratitis pannosa, iridectomy had an inhibitory effect on vascularization. There was improvement of vision in one case, and no change in the other

In one case of corneal fistula, the first iridectomy improved the tension of the eyeball. A second iridectomy, followed by puncture, was necessary for a cure, with preservation of vision.

Iridectomy was done in four cases of keratocele, with cure and improvement of vision, in all cases.

One case of keratitis bullosa was cured by iridectomy with improvement of vision.

In hypopyon keratitis there was cessation of the process in 60% of the cases, with cessation of pain in 10%. Forty per cent. required other treatment. Vision remained the same in 10%, and was slightly improved in 90%. Iridectomy is no longer considered safe in this condition, on account of the danger of infection. In four cases of acute specific iritis there resulted evacuation of the exudate from pupil and anterior chamber, with improvement of vision.

In chronic iritis, iridectomy prevented relapses of the iritic process in 81% of cases. The vision was improved in 68%, and remained the same in 32%.

In the cases of iridocyclitis, iridectomy, in addition to improving the circulatory conditions between anterior and posterior chamber, resulted in improvement of vision in 62.5%, the vision remaining the same in 29%. In iridochorioditis, in 75% of cases a diminished tension was brought

up to the normal. The peripheral vision was improved in 28%, and remained the same in 69%.

In three painful bulbi, the operation caused cessation of pain.

Central vision was improved in 64%, remained the same in 28%, and diminished in 8%.

In sympathetic iridocyclitis, with frequent relapses and increased tension, iridectomy is indicated only rarely, and when increased tension or relapse does not urge, should be done when the eye is not irritated.

In two out of seven cases the operation resulted in diminution of the exudate, with clearing up of the cornea. In two cases, it caused a cessation of the process. In three cases, the iridectomy did not prevent a diminution of vision. In two cases vision remained the same, and in two cases was improved.

In two cases of cyst of the iris, cure with improvement of vision was attained.

In four cases of amotio retinæ, iridectomy was not followed by reposition of the retina. In one traumatic case, the operation was followed by improvement of vision. In two cases vision remained unchanged, and in one case diminished.

In acute glaucoma, iridectomy was followed by diminished vision in 2.6% of cases. In 35%, there were relapses, which in most cases could be controlled by miotics. Sixty-nine per cent. were improved. Vision remained the same in 12%, and was diminished in 18%.

In chronic inflammatory glaucoma, operation was followed by recurrences in 19%, of which 12.5% were controlled by miotics. There was improvement of vision in 35%, diminution in 39%, and no change in 26%.

In glaucoma simplex, tension was reduced to normal in 80.5%. Recurrences occurred in 31%. A second iridectomy was necessary in 6%. Three per cent. ran a malignant course after the operation.

When a glaucoma iridectomy in one eye is followed by a malignant course of the glaucoma, iridectomy should not be performed on the second eye.

Of seven cases of absolute glaucoma operated on on account of pain, five improved.

Central vision was improved in 18%, remained unchanged in 28%, and was diminished in 54%.

In hydrophthalmos two operations resulted in diminution of tension, with preservation of vision. In one case, a second iridectomy was necessary.

In partial corneal staphyloma, there was diminution of tension after the first iridectomy in 73%. In 14%, a second iridectomy was necessary, in 5% a third iridectomy, and in 8% other operative procedures were necessary.

In 82% there was improvement, in 14% no change, and in 4% diminution of vision.

In cases of seclusio and occlusio pupillæ with increased tension, a single iridectomy caused reduction of tension in 82%. In 9% a second and a third operation was necessary.

In 50% vision was improved, in 20% it remained the same, and in 21% it was reduced.

In 8 cases of secondary glaucoma, caused by changes in the lens, iridectomy brought down the tension in all cases. In six cases there was improvement of vision, and in two cases it remained unchanged.

In keratoconus with increased tension, the tension was reduced in one case out of three. In the other two cases, a second iridectomy was necessary. Vision was improved in two cases, and remained unchanged in one case.

In three cases of sclerectasia with severe pain, the pain was relieved by iridectomy.

In hemorrhagic glaucoma, iridectomy is contra-indicated. In two cases in which it was done as a last resort in place of enucleation pain was relieved, but there was diminution of vision.

C.—PROPHYLACTIC IRIDECTOMY.

In unripe cataracts, simple iridectomy caused ripening in 77% of cases.

A combination of iridectomy, with massage of the lens, caused ripening in 95%.

Of complicated cataracts, 57% were ripened by simple iridectomy.

In cataract extraction, according to the author's experience,

iridectomy combined with extraction, ensures a safer course to the operation, than a simple extraction.

The combined method is the principal cataract operation.

XV.

ON THE THICKNESS OF THE SCLERA IN EYES WHICH ARE THE SEAT OF PRIMARY GLAUCOMA.

By Dr. G. ISCHREYT, Libau.

L. Heine, and Marschke, in measuring the thicknesses of the sclera in myopic and hydrophthalmic eyes, found that, in the former, the posterior portion was especially thinned, and in the latter, the anterior portion. The author examined the thickness of the different portions of the sclera, in ten glaucomatous eyes.

The eyes were hardened in formol and increasing strengths of alcohol, and embedded in celloidin.

Four of the eyes examined had a sagittal diameter of 24*mm*, one of 24.5*mm*, and five of 25*mm*. The last five were possibly myopic.

In myopic eyes, according to Marschke, the sclera in the macular region is never above 0.52*mm* in thickness. Of the five of the author's cases with a sagittal diameter of over 25*mm*, only three cases have a thickness of less than 0.52*mm*, in the foveal region. Two of the cases show typical myopic changes at the optic-nerve entrance.

Of the five cases with sagittal axis of less than 25*mm*, none shows an abnormal thinning of the sclera at the posterior pole.

Marschke found the minimum thickness in the equatorial region in emmetropic eyes to be 0.36*mm*.

Of the author's cases, four show no thinning in this region. Two cases show a slight thinning, 0.31 and 0.33*mm*, and the other four show a decided thinning, 0.28, 0.25, 0.19, and 0.12*mm*.

The measurements at the ora serrata are difficult to estimate, because it is difficult to tell how much is tendon and how much sclera.

According to Marschke's measurements the lowest values in this region, in normal eyes, are 0.4 and 0.42*mm.*

In the author's cases, six eyes are below this measurement. They measure, respectively, 0.33, 0.31, 0.22, 0.33, 0.36, and 0.33*mm.*

At the limbus, Marschke found the lowest values to be 0.4 and 0.42*mm.* Six of the author's cases are below this: 0.37, 0.34, 0.34, 0.31, 0.33, and 0.37*mm.*

In two of the cases, the nasal scleral border of the optic canal showed a sharp overhang looking like a spur on section. The author considers this to be indicative of myopia in a glaucomatous eye.

The author's conclusions may be summed up as follows:

1. In primary glaucomatous eyes, there is a thinning of the sclera, especially in the anterior and equatorial regions. This thinning is a very common occurrence in the absolute stage of glaucoma.

2. The posterior half of the globe seldom shows any thinning, except as a result of myopia.

3. A scleral spur at the edge of the glaucomatous excavation denotes a myopia in a glaucomatous eye.

4. The lengthening of the sagittal axis of glaucomatous eyes usually depends, outside of a possible myopia, upon a stretching of the anterior portion of the globe.

5. The thinning of primary glaucomatous eyes resembles that of hydrophthalmos, as opposed to that of myopia.

XVI.

A STEREOSCOPIC OCULAR TO THE AUTHOR'S NON-REFLECTING OPHTHALMOSCOPE.

By Dr. W. THORNER, Berlin.

The ocular is attached to the eye-piece of the ophthalmoscope, and consists of a horizontal transverse tube, the length of the distance between the two eyes of the observer, at each end of which is a tube at right angles to the transverse tube. At the middle of the transverse tube is an achromatic objective lens which conveys the rays which pass through it to a focal point, a short distance behind the lens, thus forming

a second image of the fundus at this point. Here there are two prisms, one in the upper half and one in the lower half of the tube. These prisms refract the rays, half to one end of the tube, and half to the other end, where they are reflected by other prisms to the eyes of the observer.

XXI.

ON THE CAUSES OF BLINDNESS IN EGYPT.

By Dr. ALFRED OSBORNE, Alexandria.

The following paper is based on an analysis of 500 blind eyes, seen at the eye clinic of the European hospital at Alexandria. An eye is considered blind when the vision is reduced to perception of movement of the hands, or lower.

Only incurable conditions are included in the list.

Of the 500 eyes, 206 were bilateral, and 294 unilateral. 297 were in males, and 203 in females, a ratio of 3 to 2.

85.8% of the cases were in natives. Of the remaining 14.2%, there were

Oriental Israelites	5.0%
Italians	3.2%
Maltese	1.8%
Syrians	1.8%
Greeks	1.4%
Armenians	0.4%
Austrians, Spaniards, and Turks, each	0.2%

The foreign colony consists of 13.3% of the population of Alexandria, so that we might be led to suppose that blindness was about equally divided between the natives and foreigners. But about 30% of the patients at the polyclinic are foreigners, so that the proportion of blindness among the foreigners is really not as great as among the natives.

Most of the cases of blindness occur in the first decade of life. From here onward, there is a gradual diminution, until we reach the fifth decade, when there is again a rise due to glaucoma.

Thirty-eight per cent. of the cases of blindness are due to

acute purulent conjunctivitis. 29.8% are due to primary glaucoma.

The author noticed in a series of 132 glaucomatous eyes, that trichiasis was present in 17%, and thinks that there may be some causative connection between the two.

11.8% are due to trachoma. Trichiasis is an important factor in most of the cases. 4.6% are due to sympathetic ophthalmia. 3.6% are due to variola.

REPORT OF MEETING OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. H. W. WOOTTON, Secretary.

MEETING OF MONDAY, MARCH 16, 1908. DR. T. R. POOLEY, CHAIRMAN PRO TEM.

Present, 39 members.

Dr. H. W. Wootton presented a case of **recovery from choked disks which had followed an operation for mastoid disease.**

Patient was operated upon January 25, 1907, at the New York Eye and Ear Infirmary. A simple Schwartze mastoid was done and patient was one week in the hospital. The operation was performed by Dr. J. B. Rae. There was extensive destruction of the bone so that under the outer table the divisions between the cells were broken down and the whole mastoid was one large pus cavity. The sinus was opened accidentally by a spicula of bone. The mastoid was cleaned out and dressed. Hemorrhage easily controlled. The infection was of the streptococcus variety. Two weeks after discharge (three weeks after operation), developed headache and vomiting. Vomiting continued about one week, then gradually disappeared. Blood count showed leucocytes of 20,000 and the differential count polymorphonuclear of 70%. Continued examinations of the blood showed gradual improvement, until at the end of a month the blood was normal and remained so. During this period, the hospital records show that the pulse and temperature were frequently sub-normal. The highest temperature recorded was 99° by

the mouth, and pulse 84. The lowest temperature was 97½° by the mouth; lowest pulse 62. Dr. Rae states that he considers these records inaccurate. He never found the pulse less than 72 and the sub-normal temperature he believes to be open to doubt. Urine normal throughout. Patient first seen by Dr. Wootton February 10th (over two weeks after operation). Commencing choked disks in both eyes—more marked in the left. Swelling continued to increase and in two weeks was well marked. Left pupil more dilated than the right. V. $\frac{2}{20}$ O.D. and S. Choked disks typical. No retinitis and no hemorrhages. Swelling limited to the papilla. The possibility of cerebral abscess was considered. Dr. McPhee, who examined the patient, found no localizing symptoms. Patient up and about by March 1st. Swelling of disks continued and was still well marked during April. About the middle of May swelling had markedly subsided. Patient went to Europe in May, returning in March, 1908. March 5th—V. $\frac{2}{20}$ in both eyes. Refraction + 3 sp. right and left. In the right eye there was a slight accumulation of pigment on temporal margin of disk, lamina cribrosa visible. All the vessels were of normal size. A grayish, opaque mantling of inferior arterial stem, which extends downwards for about one-half papilla diameter from the disk and gives the appearance of an interruption of the blood current. Otherwise normal. O.S. vessels somewhat smaller than normal. Temporal portion of the disk clean and distinct and lamina cribrosa visible. Nasal portion still slightly hazy. The visual fields taken March 5th were perfect for form. The color fields for red and green in both eyes were rather abnormally large, the field for green sometimes extending farther towards the periphery than that for red. The case seemed to have been one of recovery from choked disks, without neuritic atrophy. Conditions which have led to their development seemed doubtful. Dr. Wootton was strongly in favor of cerebral abscess which had subsequently become incysted. Macewen, of Glasgow, states that choked disks with cerebral abscess is exceedingly common and that it is but rarely followed by neuritic atrophy.

Dr. E. B. Coburn asked if a lumbar puncture had been made. Dr. Wootton replied that it had not.

Dr. E. Gruening stated that optic neuritis in connection with ear disease was common and that he did not remember ever having seen atrophy following mastoid disease. Sometimes the choked disks would persist for a long time after the cure of the mastoid or sinus thrombosis and yet atrophy would not follow.

Dr. W. L. Leszynsky thought the cause was probably pressure from serous meningitis or localized meningitis.

Dr. E. Gruening stated that choked disks did occur in simple mastoid and might be due to toxæmia and not to cerebral pressure.

Dr. C. Koller thought that the connection in this case was most probably a sinus thrombosis not necessarily septic. He had seen such cases. In one case, he had accidentally torn into the sinus and produced a non-septic thrombosis. This was followed by choked disks and hemorrhages. Some two weeks later, the patient recovered. In two cases of infective, non-occluding thrombosis, choked disks developed after ligation of the vein. All three of these cases cleared up perfectly, and lasted from six to eight months.

Dr. T. R. Pooley stated that, in 1903, he had published a report of a case of acute mastoiditis in which the sinus was exposed during the operation. Sinus thrombosis developed. The thrombus was removed as far down as the jugular bulb. The patient developed pyæmic symptoms with abscesses and septic pneumonia. Within two weeks after the second operation, choked disks developed. Patient recovered in about three months, with no atrophy and good vision.

Dr. Selina Bloom presented two cases:

(*a*) **A case of albuminuric retinitis in a child.** There was a history of pneumonia and scarlatina five and six years previously. Child physically undeveloped, has hypertrophy of the heart and a high-tension pulse. Urine shows low specific gravity, albumen, and casts. Only symptom, constant headaches.

(*b*) **Case of sympathetic uveitis.** Began two years ago, about six weeks after a cataract extraction, in which the iris had been drawn into the sclero-corneal scar. Some vision and a good field were retained in the operated eye. Mercurial treatment resulted, after one recurrent attack of serous iritis,

in full recovery of vision in the sympathizing eye. An iridotomy was made upon the operated eye after six months, because of a very gradual increase of ocular tension. Since that time, the eye has remained quiescent.

Dr. E. S. Thomson presented a case of **sympathetic ophthalmia treated with aspirin.**

The patient was a man about 43 years of age, who had been treated with large doses of aspirin for a severe attack of sympathetic ophthalmia. At the time of his first presentation at the meeting of October, 1907, the eye was quiet but the vitreous was still cloudy and vision was $\frac{20}{200}$. Some members of the Section had expressed a doubt as to the ultimate result. Dr. Thomson presented him merely to show the final result. The vision is now $\frac{20}{40}$, the vitreous clear, and the only sign of the attack is a small area of choroidal degeneration at the macula.

There was no discussion of Dr. Bloom's first case. In respect to the second, Dr. T. R. Pooley asked the vision in the primary eye. Dr. Bloom stated that it was fingers at ten inches and that the field was good.

Dr. T. R. Pooley had seen a case in which the exciting eye retained clear vision while the sympathizing eye had gone blind. Dr. Bloom stated that the exciting eye had not been enucleated because of its good vision and tension.

Dr. C. Koller stated that he would not enucleate after sympathetic inflammation had broken out if the exciting eye had good vision.

Dr. J. H. Claiborne had recently seen a case of iritis in the right eye. The eye became blind in a few months. Symptoms of acute inflammation subsided then and the other eye became inflamed. The first eye at this time was quiescent. Mild inflammation of the optic nerve of the secondary eye was apparent. Dr. Claiborne diagnosed commencing sympathetic ophthalmia and recommended enucleation of the first eye. This was done and, within forty-eight hours, the symptoms of inflammation and irritation had subsided.

Dr. E. Gruening stated that the prognosis in Dr. Thomson's case was good and removal was out of the question.

Dr. T. R. Chambers stated that twenty years ago he had

attended a man with gonorrhœal ophthalmia with all grades of uveitis. The eye got better but the other eye became inflamed. Enucleation of the first eye was declined until a relapse, which occurred fourteen years later.

Dr. E. L. Oatman stated that Fuchs had demonstrated that sympathetic ophthalmia is a specific disease, accompanied by tubercles and giant-cells. Every case of uveitis occurring after injury was not sympathetic. In all cases a course of mercury was advisable.

Dr. E. S. Thomson stated in regard to the prognosis that the important point was the condition which had excited the secondary uveitis. Both his case and Dr. Bloom's were to be classed among those relatively mild, that is to say, not due to a foreign body or wound of the ciliary region. Cases due to inclusion of the iris after cataract extraction were often mild.

Dr. C. Koller stated that some cases were more exudative than others, but that the cases caused by adhesion of the iris in the wound after cataract extraction were not always mild. He had had one such case in which the exciting eye went blind and was enucleated. The sympathizing eye gradually developed increasing tension and went blind after an iridectomy.

Dr. E. B. Coburn stated that, whether the sympathetic ophthalmia was due to a specific cause or not, the exciting cause was the injured eye, and if it had poor vision it ought to be removed. Cataract cases, when treated early, sometimes recovered under salicylates or inunctions.

Dr. Francis Valk thought that the exciting eye should most certainly not have been removed in Dr. Bloom's case.

Dr. E. Gruening stated that, if the injured eye had useful vision and the secondary eye was already affected, he had never removed the exciting eye. He would not remove an exciting eye that still sees.

Dr. E. L. Meierhof had removed the injured eye in one case but sympathetic inflammation had continued. Under atropin, hot applications, and aspirin, the patient had made a good recovery.

Dr. T. R. Pooley presented a case of **arterio-venous aneurism (pulsatory exophthalmos).**

The patient, a negro of about thirty, was struck on the back of the head by a "spliced blackjack" on New Year's night. There were three wounds on the scalp, one on the parietal bone near its junction with the occipital, one further forward, and another on the temple. He was felled by the blow, remained unconscious for some time and, upon regaining consciousness, was greatly disturbed by a most distressing noise in that side of his head, which was the principal subjective symptom of which he complained. Dr. Pooley saw him a day or two after. All the symptoms of arteriovenous aneurism were then present, except pulsation. The eye was protruding; the blood-vessels of the conjunctiva and the lids dilated. No pulsation of the eyeball could be detected, but when the ear was applied over the globe blowing murmurs and a continuous whirring and rumbling sound were heard. The patient was very much distressed by the noise which he heard on all that side of his head. The eye could be pushed back into the orbit by the hand. Compression of the carotid diminished but did not stop the bruit. At this time there was no change in the fundus and vision seemed unimpaired. The patient was so illiterate that no exact record of visual acuteness was taken. The patient was treated in the hospital for a few days by a pressure bandage and compression of the common carotid, but when operative ligation of the same was proposed he disappeared and was not seen again until March 16th.

The symptoms had now all become more aggravated. There were ptosis, exophthalmos, enormous dilatation of the vessels of the conjunctiva and lids; pulsation could be now easily obtained, especially near the inner canthus, and there was papillitis with enormous dilatation of the retinal vessels. One vein in the lower temporal region seemed to be obstructed, and, above and below the obstructed portion, was greatly distended. The noises in the head had become more aggravated, and to this was added occasional violent pain in the orbit. There was no impairment of hearing. Dr. Pooley thought the only resource was ligation of the common carotid, and asked especially for a free expression of opinion on this point.

In the discussion of Dr. Pooley's case, Dr. Arnold Knapp

stated that he had had three cases, in all of which the ligation of the common carotid had relieved the bruit, exophthalmos, and chemosis, but the optic nerve went on to atrophy.

Dr. H. S. Oppenheimer had seen a case some years ago in which the carotid had been ligated. Secondary hemorrhage, with fatal result, had followed. The tumor, however, proved to be an erectile tumor.

Dr. J. H. Claiborne had seen a case ten years ago like Dr. Pooley's. He had applied pressure bandage, which was kept up for eighteen months, and had administered mixed treatment internally. A perfect cure resulted.

Dr. E. Gruening had seen the vision immediately restored after ligation of the carotid in a case operated upon some years ago, without anæsthesia.

Dr. H. H. Tyson had seen atrophy follow the tying of the common carotid, although the other symptoms had subsided.

Dr. T. R. Pooley stated that statistics had shown about 45% of recoveries after ligation. In view of the many dangers temporizing measures were hardly permissible.

Dr. E. B. Coburn stated that many cases of cerebral symptoms and deaths following ligation of the carotid were on record. A case had recently been treated with gelatine serum and had recovered. There were a number of milder measures which might be tried.

Dr. E. L. Oatman stated that all the accessible veins in the orbit had been ligated with good results.

Dr. E. Gruening stated that the consensus of opinion was in favor of tying the carotid.

Dr. J. H. Claiborne presented **a case operated upon with a new form of cataract knife,** and read a **description of the instrument employed.** The following is an abstract:

The Graefe knife has been, practically since its invention, the classical instrument for the removal of senile cataract. Nevertheless, there are a number of sound objections which may be raised against it. It necessitates a counter-puncture which should relatively correspond with the puncture; a sawing motion is necessary to conclude the section, and it necessitates the greatest precision in adjusting the size of the section. It was long thought that, if the lens could be removed by means of an angular, lance-shaped keratome of

dimensions to make a wound large enough to allow the easy exit of the cataractous lens, the disadvantages of the Graefe section would be avoided. In order to construct such a knife, it would be necessary to know the dimensions of the lens without its capsule. In general, the lens after delivery had a diameter of 9*mm*. He had then attempted to find the diameter of the anterior chamber in the vertical meridian. This he concluded to be about 11.6*mm*. It therefore became necessary to construct a lance-shaped knife which would make an opening in the anterior chamber large enough to allow the easy exit of a lens 9*mm* in diameter. He had had a knife so constructed that when it was thrust into the anterior chamber and its apex had arrived at the inferior corneal angle, the chord, which measures two-fifths of the diameter of the anterior chamber, would correspond to a wound 9.2*mm* in length. Antecedent to having this knife constructed, he had had another made, the base of which was 12*mm* and the length 6*mm*. The use of this upon a cadaver had been unsatisfactory. He had used it upon a soft cataract in a woman thirty years of age, but the angle caused by the above stated dimensions was so obtuse (90 degrees) that the knife entered the cornea only to one-half its length. The incision really amounted to the old linear one, and this experiment proved nothing.

The knife mentioned (12*mm* in base and 8.048 in length) was used upon a woman of forty. The cataract had been ripe for several months. It was of the dark yellow, sticky variety. The knife was entered about 2*mm* behind the apparent sclero-corneal margin. The entrance was easy, and the knife was shoved home, the apex of the blade apparently entering the lower iris angle. As the knife was withdrawn, a sidewise cutting stroke was employed in order to slightly enlarge the corneal section. The wound gaped and the lens presented at the mouth, but pressure failed to cause extraction. An attempt was then made to enlarge the nasal lip of the wound by the use of de Wecker's scissors, but they failed to cut, and a more extensive cystotomy was made. The lens was then delivered as easily as such sticky lenses usually are. Dr. Claiborne was convinced that the corneal wound had not been at all enlarged by the scissors,

and that, had he made the cystotomy more extensive and more thorough in the beginning, the lens would have been delivered at the first attempt. The wound closed in forty-eight hours, although there was some striped keratitis. The patient left the hospital on the seventh day without a single untoward symptom.

Weber, of Darmstadt, in 1867 had set forth the idea of removing cataract by an angular keratome. Earlier than this, Daviel in 1752, and les frères Grandjean, Paris, 1766, removed cataracts with knives which more nearly resembled that of Weber than his resembles the one which Dr. Claiborne had just described. The idea therefore was not Weber's but Daviel's. All of these knives differ, and all of them are entitled to their place in the archives of ophthalmology.

Weber's knife is a bent knife of a heart shape, whose back is hollow ground. It has a length of 10.25*mm* so that it may cross an anterior chamber of 12*mm* diameter to the opposite scleral limbus; 6.5*mm* from its point it has a breadth of 10*mm* and it increases in width 2*mm* more at its base. It then tapers off to the handle.

The advantages of the lance-shaped knife may be stated as follows:

1. There is no counter puncture.
2. The wound is a stab wound, and by virtue of that fact is smooth. No sawing motion is employed.
3. The section is finished by shoving the knife home.
4. There is no loss of aqueous while the section is being made.
5. The iris is not so apt to prolapse upon withdrawing the knife.
6. The iris cannot fall before the knife.
7. Perfect apposition of lips of the wound by virtue of its smoothness leads to rapid healing, less liability to suppuration, and less post-operative astigmatism.
8. Use of the right hand for both eyes.
9. If the knife is entered properly, the section is bound to be correct.
10. Less danger of prolapse of vitreous because of the support furnished by the broad back of the knife.
11. Diminished time.

Since experience in the use of the knife is so limited, it may be argued that many of these points are academic, but they are at least backed by reason, and the fact remains that one of the most difficult of cataracts to extract has been successfully extracted by means of the knife described.

Dr. Francis Valk for a great many years has made a section with the Graefe knife without employing a sawing motion.

Dr. E. Gruening stated that there was some difficulty with the lance-shaped knife. It became dull very soon. He was very well satisfied with the Graefe.

Dr. E. B. Coburn stated that the instrument from an academic point of view ought to be good, especially for beginners. Mechanically there was difficulty in sharpening the Weber curved hollow-ground triangular knife, but the straight-edged, flat keratome could be sharpened with ease.

Dr. Selina Bloom had seen the Weber knife used in Leipsic but it had been given up on account of the difficulty of sharpening and of getting the exact hollow-ground curve desired by Weber.

Dr. T. R. Pooley had tried two or three sections with the Weber knife many years ago. The section was too small. He was not altogether sure that prolapse of the iris was prevented. In regard to sharpening, a new knife could, if necessary, be employed for each operation.

Dr. E. S. Thomson read a paper entitled **The diagnostic value of tenderness in the ciliary region.**

The author dwelt upon the importance of the symptom of ciliary tenderness in the following conditions:

1. Cramp of the muscle fibres.
2. Hyperæmia of the muscle fibres.
3. Inflammation.

Tenderness in cramp of the fibres has not been frequently mentioned. It occurs whenever the muscle reacts from refractive error, as in hyperæmia or the various forms of astigmatism. In certain cases of astigmatism the tenderness is at first located in the meridian of contraction, though it ultimately extends to the entire ciliary muscle. Atropin is the best method of treatment, and as soon as the pupils are well dilated the tenderness subsides. Tenderness in hyper-

æmia of the ciliary muscle occurs whenever the engorgement of the ciliary region reaches a certain height. It does not invariably indicate cyclitis. Cyclitis is probably present when the tenderness increases to a certain intensity. In inflammation of the ciliary body, a wide range in the intensity of the symptom is present.

Dr. Alexander Duane stated that conditions of tenderness occur in the upper lid which may sometimes be mistaken for ciliary tenderness. The tender point was in the tarsus, and occurred with conjunctivitis and in some rheumatic conditions. This might be a source of confusion and might lead us to diagnosticate a case of ciliary tenderness when it did not exist. This tarsal tenderness was evidently superficial and not deep, and was very localized.

Dr. T. R. Pooley stated that the point of true ciliary tenderness is always situated slightly to the nasal side of the middle line, as shown by Dr. P. A. Callan some years ago.

REPORT OF THE MEETING OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By Mr. C. DEVEREUX MARSHALL.

An ordinary meeting of the Society was held on Thursday, March 12th, Mr. R. Marcus Gunn, F.R.C.S., President, in the chair.

The following cases were shown: Mr. E. E. Henderson: **An orbital case for diagnosis.** Mr. G. H. Goldsmith, **A case of retinitis.** Mr. Arnold Lawson: **A case of (?) albuminuric retinitis in a child, and a case of (?) Parinaud's conjunctivitis.** Mr. A. H. Thompson: **Punctiform remains of pupillary membrane, both eyes.** Dr. J. F. Cunningham: **Unusual form of choroidal retinitis.**

The meeting then resumed the discussion on Mr. Leslie Paton's paper, read at the previous meeting, on **optic neuritis in cerebral tumor.** Mr. Paton first modified his paper in respect of some of the percentages, subdividing them into more convenient classes. He also stated that since reading the paper he had been through the records of sixty additional cases, which bore out the conclusions he had formed on those already published. Mr. Herbert Parsons said the paper was essentially statistical, and statistics did not lend themselves well to discussion; the only part open to debate was the conclusions which the author had formed on the figures. The records of the cases were of great value, because the ophthalmoscopic appearances were observed by the President. There was a distinct apparent discrepancy between the details in this series and those previously published by others. A recent series by Uhthoff, of Breslau, more nearly coincided

with those of Edmunds and Lawford than with Paton's. Mr. Parsons insisted on the importance of not only recording the amount of swelling of the disk, but the stage at which it was observed. He was not in agreement with Mr. Paton's explanation of subcortical and pontine tumors in regard to vascularity. He did not regard the star at the macula as a mere result of the violence of the neuritis; there were cases equally violent in which no star was present. The latter he had seen more commonly in children than in adults. He suggested that suggestions as to the cause of optic neuritis should be omitted from the discussion, as it did not really arise out of the paper. Sir VICTOR HORSLEY, speaking as a visitor who had not heard the paper but had an opportunity of looking it through, said the contribution was really founded on records of his own cases, and yet he was diametrically opposed to one of its most important conclusions. He protested against Mr. Paton's conclusion going forth under the ægis of that great Society as the one justified by the records of the Queen Square cases. He, Sir Victor, had taught for years, and had supported it by operative proof, that one was justified in regarding the homolaterality of the lesion as a point of clinical value. Every case must be dealt with on its merits, and he thought the difference of opinion between Mr. Paton and himself was due to the treachery of clinical statistics. He had long taught that it was essential to study the neuritis by the character of the changes in the disk, not the mere swelling. It was necessary to know whether it was an exudate, and indeed the minutest details of it. He had often seen a macular fan entirely disappear after the removal of a cerebral tumor. One point, which was learned from the Queen Square cases twenty years ago, but which did not find a place in the paper, was the question of pressure. Free opening of the dura mater would cause subsidence of the neuritis. The records contained very much information on that point, and he hoped Mr. Paton would be able to include it in his paper. Sir WILLIAM GOWERS sent a communication supporting some of Sir Victor Horsley's criticisms. Dr. BEEVOR agreed with Sir Victor Horsley's remarks concerning the age of the neuritis. In fifty cases of cerebral tumor of all kinds which he investigated for his Lettsomian Lectures last year, the optic neu-

ritis was most severe on the same side as the tumor. Dr. Farquhar Buzzard complained that Sir Victor Horsley had not brought forward figures to support his view on homolaterality, valuable though his opinion was. The number or proportion of cases in which the neuritis occurred on the same side was not great enough to make it diagnostically important. Placing too much stress on the doctrine might lead to serious error. The President thought the truth in the matter lay between the views of Mr. Paton and Sir Victor Horsley, in the way mentioned by Dr. Farquhar Buzzard. Mr. Paton replied, quoting cases from his paper in confirmation of his previous contention.

Dr. Thomson Henderson (Nottingham) gave a lantern demonstration on the venous connections of Schlemm's canal. He said the channels of the aqueous outflow were: Schlemm's canal, the suprachoroidal space, the iris. The last was an absorbing surface only because of its crypts. His object was to show the close venous connection between those three channels. The vascular supply of the ciliary body was derived from the circulus arteriosus iridis major, formed by the two long posterior ciliary arteries, reinforced by the eight anterior ciliary arteries, two from each rectus. The whole of the venous blood was returned *via* the venæ vorticosæ, except the small area drained by the anterior ciliary veins. A study of a large number of series of consecutive radial sections brought out the following points. In each *mm* of the scleral circumference (42 sections equal 1*mm*) there was never less than one anterior perforating scleral vessel, frequently two, and occasionally three. There was free anastomosis among the vessels. Each perforating vessel sent or received an efferent branch from Schlemm's canal. He had not been able to find a perforating scleral vessel not connected with Schlemm's canal. Therefore all those vessels were veins, and the so-called circulus arteriosus iridis major was a sinus venosus iridis. Schlemm's canal was nothing more than an offshoot of the iris veins. Before perforating the sclera, the iris veins were in free communication with the ciliary veins and radicals of the venæ vorticosæ. In chronic glaucoma, when adhesions of the iris root had been long enough established, serial sections showed new-formed vessels per-

forating the pectinate ligament, and connecting directly the iris veins with Schlemm's canal. This bore greatly on glaucoma and its treatment by iridectomy, as the success of the latter depended on the iris being an absorbing surface only by virtue of its crypts. Its effect was that of a large crypt occupying three sides of a square, for in a healthy iris the cut surfaces forming the base and pillars of the coloboma never healed. Cicatrization was a protective process following as a result of the reaction of the cells of a tissue to irritation or altered condition of life. A successful iridectomy left the tissue cells bathed in aqueous, so that no stimulus was imparted to them to cause the formation of a dense protective layer. The cut iris tissue thus remained unaltered, and so presented a large raw surface, by means of which the aqueous could readily drain away, provided (a very important point) the operation were done before atrophy and damage to the iris structure had proceeded too far.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE THIRD AND FOURTH QUARTERS OF THE YEAR 1907.

By Dr. G. Abelsdorff, in Berlin; Prof. St. Bernheimer, in Innsbruck; Dr. O. Brecht, Prof. R. Greeff, Prof. C. Horstmann, and Dr. R. Schweigger, in Berlin; with the Assistance of Prof. A. Alling, New Haven; Prof. E. Berger, Paris; Prof. Cirincione, Genoa; Dr. Dalén, Stockholm; Prof. Hirschmann, Charcow; Dr. J. Jitta, Amsterdam; Mr. C. Devereux Marshall, London; Dr. H. Meyer, Brandenburg; Dr. P. von Mittelstädt, Metz; Dr. H. Schulz, Berlin; Prof. Da Gama Pinto, Lisbon; and Others.

Translated by Dr. Percy Fridenberg, New York.

Sections I–III. Reviewed by Prof. C. HORSTMANN, Berlin.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

136. Bielschowsky, A. **Disturbances of ocular motility.** *Graefe-Saemisch*, Part II., viii., Leipzig, 1907.

137. Birch-Hirschfeld, A. **Diseases of the orbit.** *Ibid.*, ix.

138. Uhthoff, W. **Ocular symptoms in diseases of the meninges.** *Ibid.*, xi.

139. Dimmer, F. *Photography of the fundus oculi.* Wiesbaden, 1907.

140. Del Castillo y Quartelliere, R. *Ophthalmology in Roman times.* Leipzig, 1907.

141. Greeff, Rich. *Rembrandt's "Healing of Blind Tobias."* Stuttg., 1907.

142. Heine and Lentz. *Color vision, in artists especially.* Jena, 1907.

143. Lawrentjew, A. G. **The influence of orange-yellow glasses on marksmanship of various troops.** *Wojenno Med. Journal*, May, 1907.

144. Hansell, H. F. **Biographic sketch of William Thompson.** *Annals of Ophth.*, July, 1907.

145. MacCallan, A. F. **Four years' work with the ophthalmic hospital in Egypt.** *Ophthalmoscope*, Sept., 1907.

Bielschowsky (136, **Disturbances of ocular motility**) carries on the chapter begun by the late Alfred Graefe, and discusses the localization of things seen in regard to height, width, and depth, the motor association of the eyes, the reflex character of eye motions, fusion impulse and fusion motions, homologous rotations, the field of fixation, cerebral centres and paths for eye motions, paralyses and pareses, and the tests of motility.

Birch-Hirschfeld (137, **Diseases of the orbit**) takes up a theme formerly handled by Berlin. He describes the anatomical conditions, the influence of widening and narrowing of the lid fissure, of irritation and paralysis of the sympathetic, of cocain, and of head positions and circulatory changes. The various forms of exophthalmus are then discussed, such as those due to deformity of the orbital walls, cranial malformation, peaked skull, rhachitis, hydrocephalus and enophthalmus, and ectasia in neighboring sinuses.

Uhthoff (138, **Ocular symptoms in diseases of the meninges**) discusses hemorrhagic pachymeningitis and sinus thrombosis, both of which may cause exophthalmus, disturbance of motility, and fundus changes. In tuberculous meningitis we may find optic neuritis, dilatation of retinal veins, tubercle of the choroid, nystagmus, and disturbances of motility and of pupillary reaction. Epidemic cerebro-spinal meningitis may be complicated with disease of the conjunctiva and cornea, optic neuritis, metastatic ophthalmia, oculomotor paralyses, pupillary changes, nystagmus, and anomalies of the lids. In otogenous meningitis we may find optic neuritis, neuro-retinitis, choked disc, and disturbances of motility, as in that following acute infections; and in the purulent form without definite cause, there may be metastatic purulent ophthalmia, affections of the optic nerve, central amaurosis, hemianopsia, and disturbances of motility. Chronic simple meningitis is especially often complicated by optic nerve changes. Meningitis due to malignant new-growths may cause choked disc, neuritis with motor ocular disturbances, while serous meningitis with hydrocephalus also shows choked

disc, optic neuritis, or atrophy, retinal changes, and disturbances of motility.

Dimmer (139, **Photography of the fundus oculi**) reviews previous work in this field, the value and the difficulties of the methods, and the technical means of overcoming them, and develops the principles of his apparatus, which is fully described. Special chapters are devoted to the handling of the apparatus, making photograms, time of exposure, negatives and positives, plates and printing, interpretation and value of photograms. While absence of color is a serious drawback as compared with fundus drawings, photography of the fundus is a valuable clinical aid, facilitating repeated examination and comparisons. Changes of level do not show well, and, especially in young subjects, the light reflexes are annoying—polarized light being impracticable on account of loss by absorption. Pigment deposits do not generally appear as dark as we see them with the ophthalmoscope. Opacities in the media, and astigmatism are less disturbing than might have been expected. The apparatus can also be used for demonstration of the fundus. Ten plates are shown.

Del Castillo y Quartelliere (140, **Ophthalmology in Roman times**) treats of the signets and seals of Roman oculists, the Madrid seal, epitaphs, collyria and their names and uses, methods of treatment, ophthalmic surgery, materia medica, and formulary.

Greeff (141, **Rembrandt's "Healing of Blind Tobias"**) has made a group of all the drawings, etchings, and sketches which belong to this picture which hangs in the castle of the Duke of Arenberg in Brussels. The picture gives a realistic representation of the old couching operation for cataract as generally performed in the 17th century. The sketches were found in Amsterdam, the Louvre, Berlin, Frankfort, Vienna, and Stockholm. Rembrandt seems to have made extensive studies for this picture, and the sketches show that he was one of the greatest observers and describers of nature.

Heine and Lentz (142, **Color vision, in artists especially**) discuss the question whether the majority of human beings see colors alike, or whether there are individual differences of sensation, and whether in professional artists particularly

any such variations can be demonstrated. They examined fifty subjects, of whom fifteen were artists, both male and female. They conclude that in normal individuals there are practically no qualitative variations, and but slight differences of a quantitative kind. Raehlmann on the contrary believes that characteristics and manner of artists depend almost entirely on differences in color perception. The authors were unable to determine any notable variety of color systems or any marked differences in the naming of colors. Artistic individuality is rather to be explained on psychological grounds.

Lawrentjew (143, **The influence of orange-yellow glasses on marksmanship of various troops**) shows that there was marked increase of accuracy in shooting with field-pieces and infantry rifles particularly at long range and in cloudy weather. Glasses with a ground glass periphery tire the eyes quickly as the pupil is frequently not opposite the centre of the transparent glass. Hirschmann.

MacCallan, A. F. (145, **Four years' workwith the ophthalmic hospital in Egypt**) describes the work done in the travelling ophthalmic camps founded by Sir Ernest Cassel.

In 1906, 40,103 patients were seen, and 7327 admitted; 5846 operations were performed.

2000 of these operations were for entropion (or trichiasis) the result of trachoma. To relieve this condition MacCallan performs what he describes as *my modification* of Snellen's operation. The modification described corresponds, even to the number of sutures employed, with that elaborated by Dr. W. E. Cant, Director of the British Ophthalmic Hospital at Jerusalem, and performed by him regularly for the past nineteen years at that Hospital. MacCallan has no right whatever to appropriate the operation as his own.

Two English surgeons work under MacCallan and a staff of Egyptian surgeons and assistants has been trained.

T. Harrison Butler.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND TREATMENT.

146. v. Michel, J. **Histological changes of the ocular vessels in syphilis.** *Zeitschr. f. Augenh.*, xviii., 4, p. 295.

147. Casale, A. **Amblyopia due to sun gazing.** *Annal. di ottalm.*, xxxvi., 3–4, p. 189.

148. Schulze, W. **Silver-stained spirochætæ in the cornea.** *Klin. Monatsb. f. Augenh.*, xlv., i., 5–6, p. 466.

149. Tomaczewsky. **Communicability of experimental ocular syphilis in rabbits.** *Muench. med. Wochenschr.*, 21, 1907.

150. del Monte. **On a common bacillus of the conjunctiva.** *Arch. di ottalm.*, January, 1907.

151. Germani, C. **Healing process of aseptic corneal wounds.** *Rivista Ital. di ottalm.*, 1–2, 1907.

152. Chalupecky, H. **Ocular symptoms of traumatic neurosis.** *Wiener klin. Rundschau*, 19, 1907.

153. de Lieto Vollare, A. **Increased vulnerability of ocular tissues in animals after extirpation of pancreas.** *Arch. di ottalm.*, 1–3, 1907.

154. Trantas, A. **Ophthalmoscopy of ciliary region and ora serrata.** *Arch. d'ophtalm.*, xxvii., p. 581.

155. Retzlaff, Karl. **Diagnostic significance of pupillary rigidity in nervous and mental disease.** *In.-Diss.*, Berlin, 1907.

156. Birch-Hirschfeld, A. **Action of X-rays on the human eye.** *v. Graefe's Arch. f. Ophth.*, lxvi., 1, p. 104.

157. Hertel, E. **Experimental and clinical study of phototherapy in ocular disease.** *v. Graefe's Archiv*, lxvi., 2, p. 275.

158. Erb, Alb. **Subconjunctival saline injections.** *Wochenschr. f. Hyg. u. Therap. d. Augenh.*, xi., 1, 1907.

159. Torok, E. **Treatment of ocular tuberculosis with T. R.** Arch. of Ophth., xxxvi., 5, p. 625.

160. Kubly. **Bier's hyperæmic method.** *Westn. Ophthalm.*, 2, p. 593, 1907.

161. Fischler. **Benefits and dangers of alcohol injections in neuritis and neuralgia.** *Muench. med. Wochenschr.*, 32, 1907.

162. Callan, P. A. **Operations for secondary cataract.** *Journ. Amer. Med. Ass'n*, June 22, 1907.

163. Ray, J. H. **Loss of vitreous in cataract extraction.** *Ibid.*, July 6, 1907.

164. Reber, W. **Present status of preliminary iridectomy in cataract extraction.** *N. Y. Med. Journ.*, April 16, 1907.

165. Weeks, J. E. **What stage in the development of senile cataract is most suitable for extraction?** *N. Y. Med. Journ.*, March 30, 1907.

166. Green, D. W. **Extraction of cataract in capsule, by external manipulation** (Indian method). *Ophthalmology*, Jan., 1907.

167. Snell, Simeon. **Inquiry into alleged frequency of cataract in bottle makers.** *Brit. Med. Journ.*, Jan., 1907.

168. Fridenberg, Percy. **Technique of simple and combined operation for extraction of mature senile cataract.** *Amer. Journ. of Ophth.*, June, 1907.

169. Williamson, R. **Major Smith's operation for extraction of cataract.** *Ophth'scope*, Oct., 1907.

170. Elliot, R. H. **125 cases of posterior dislocation of the lens, by native operators (couchers).** *Ophth'scope*, April, 1907.

171. Henderson, T. **Histological study of healing of wounds after cataract extraction.** *Ophth. Rev.*, May, 1907.

172. Stillson, H. **Cataracts produced by shocks from commercial electric currents.** *Northwest. Med.*, Feb., 1907.

173. Alt, Adolf. **On rupture of Descemet's membrane due to high intraocular pressure.** *Amer. Journ. of Ophth.*, May, 1907.

174. Alt, Ad. **Microscopical examination of a globe in thrombosis of the cavernous sinus.** *Ibid.*, March, 1907.

175. Risley, S. D. **Surgical treatment of glaucoma.** *Journ. Amer. Med. Ass'n*, July 27, 1907.

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177. Henderson, T. **The histology of iridectomy.** *Ophth. Rev.*, July, 1907.

178. Henderson, E. E., and Lane-Clayton, Janet. **Study of the ciliary epithelium after puncture of anterior chamber.** *R. Lond. Ophth. Hosp. Reps.*, March, 1907.

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180. Moulton, H. **Staining from argyrol employed in diseases of the conjunctiva and lachrymal apparatus.** *Ophth. Rec.*, April, 1907.

181. Conner, L. **Does the opacity of incipient cataract ever regain transparency?** *Journ. Amer. Med. Ass'n*, July 6, 1907.

182. Stieren, Ed. **Atavistic descent of congenital cataract through four generations.** *Ophth. Rec.*, May, 1907.

183. Deutschmann, R. **Treatment of detachment of the retina.** *Ophth'scope*, Aug., 1907.

184. Birdwood, G. T. **Krönlein's operation for orbital sarcoma.** *Ophth. Rev.*, March, 1907.

185. Evans, J. J. **Lachrymal sac in the economy of vision.** *Brit. Med. Journ.*, Feb., 1907.

186. Stephenson, S. **Calmette reaction in ophthalmology.** *Brit. Med. Journ.*, Oct. 19, 1907.

187. M'Gillivray, A. **Uses and limitations of argyrol in ophthalmic practice.** *Ophth'scope*, July, 1907.

188. Davis, A. E. **Protest against the employment of paraffin injections near the eyes.** *Journ. Amer. Med. Ass'n*, July 20, 1907.

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192. Rollet, E. **Cure of hypopyon by drainage of anterior chamber with a horsehair.** *Ophth'scope*, March, 1907.

193. Darier, A. **Atoxyl in ocular syphilis.** *Ophth'scope*, July, 1907.

194. Dor, H. **Treatment of Graves's disease with thymus.** *Ophth'scope*, Feb., 1907.

195. Oliver, C. A. **Preventive treatment of transferred (sympathetic) ophthalmia.** *Journ. Amer. Med. Ass'n*, July 27, 1907.

196. Noyes, G. L. **Treatment of trachoma with boracic acid powder, without massage.** *Ophth. Rec.*, Oct., 1907.

197. Parsons, J. H. **Treatment of lachrymal obstruction.** *Brit. Med. Journ.*, Feb., 1907.

198. Burdon-Cooper, J. **Argyrosis, and the action of the silver salts.** *Ophth'scope*, Jan., 1907.

199. Todd, F. C. **Method of tenotomy allowing limitation of effect as desired.** *Journ. Amer. Med. Ass'n*, July 13, 1907.

200. Wuerdemann, H. V., and Hogue, G. I. **Treatment of partial optic and retinal atrophy by electricity and massage.** *Ophthalmology*, Jan., 1907.

201. Herbert, H. **Filtering cicatrix in the treatment of glaucoma. An improved operation.** *Ophth'scope*, June, 1907.

202. Butler, T. Harrison. **Comparative efficiency of nitrate of silver, argyrol, and protargol.** *Ophth'scope*, Jan., 1907.

v. Michel (146, **Histological changes of the ocular vessels in syphilis**) examined an eye which had been enucleated for suspected malignant new growth. There was marked specific disease of the vessels of the iris and of the central retinal vessels, with small cell infiltration diffuse in the choroid, or collected in foci. The process showed marked predilection for the adventitia and intima, the media escaping almost entirely, as is characteristic for syphilitic endarteritis and peri-arteritis of ocular vessels.

Casale (147, **Amblyopia due to sun gazing**) reports 14 cases following direct exposure of the eyes to the disc of the sun or to its reflection in water or in a mirror, presenting typical symptoms of photophobia, nyctalopia, diminution of vision, and positive central scotoma. The last may be absolute or relative for white and colors or for colors alone. Absolute scotoma offers an unfavorable prognosis. Slight concentric contraction of the visual field for white and for colors is often noted, with accommodative asthenopia. Ophthalmoscopic examination generally shows as the most constant symptom a dusky coloring in the macular region extending to a greater distance than normal, frequently accompanied by slight congestion of the disc, œdema of the retina, venous stasis, and occasionally a true serous retinitis.

Hemorrhages at the macula are extremely rare. Considering the probable nature of the macular affection, the most rational treatment consists in the internal administration of quinine, with complete rest for the eyes, and exclusion of all bright light. Strychnin and faradism may be used later on.

CALDERARO.

SCHULZE (148, **Silver-stained spirochætæ in the cornea**) shows the communicability of syphilis to rabbits by experiments which prove that the eye is the best point of inoculation. There is no absolute proof that the black spirals appearing after staining the sections with silver were spirochætæ, as the author believes. In the non-infected rabbit's cornea, free from syphilis, it has been shown that corneal nerve fibrillæ may easily present such an appearance and be confused with the spirochætæ.

TOMACZEWSKY (149, **Communicability of experimental ocular syphilis in rabbits**) inoculated the cornea of rabbits with syphilitic virus obtained from fresh eroded specific ulcers. Interstitial keratitis developed, and the spirochæta could be demonstrated. The iris also showed inflammatory changes, but in this tissue no micro-organisme could be detected.

DEL MONTE (150, **On a common bacillus of the conjunctiva**), in various local diseases, found a peculiar bacillus which is morphologically similar to that of Loeffler but has different characteristics in culture. It is a common saprophyte which under favorable conditions may cause slight conjunctival catarrh, which heals spontaneously and has no characteristic features. CALDERARO.

GERMANI (151, **Healing process of aseptic corneal wounds**) experimented on rabbits and domestic fowl. The first stage of repair of deep aseptic wounds consists in the formation of a regular and compact investment of epithelium which is completed in the course of from 24 to 48 hours. In penetrating wounds as well as in linear wounds of very slight extent there is no interposition of fibrin, and the wound margins come into immediate contact rapidly. Fibrin plays no part in the healing process although it may fill up a portion of the wound canal. The fresh scar gradually changes its structure by evolution, the finer fibrils gradually taking on a more

regular arrangement and straighter course. At no point in the course of healing is there any trace of inflammation or of the new formation of blood-vessels. CALDERARO.

DE LIETO VOLLARE (153, **Increased vulnerability of ocular tissues in animals after extirpation of pancreas**) publishes a series of 18 experiments on young dogs to determine the influence upon the eye of change of metabolism following extirpation of the pancreas. Simple aspiration of the anterior chamber whether in cases of glycosuria or in normal conditions of the urine was followed by interstitial opacity of the cornea beginning at the site of experimental puncture, ulceration, generally progressive, and in three cases by a true keratoconus. In other cases there were iritic symptoms with plastic exudate, or meiosis, and in a third series, merely lenticular changes, such as anterior capsular opacity, limited to the site of entrance of the needle, more or less opacification of the posterior layers, remaining stationary until the animal was killed, and leaving the central and anterior layers perfectly clear. CALDERARO.

TRANTAS (154, **Ophthalmoscopy of ciliary region and ora serrata**) describes the picture of the ora serrata as that of a deeply pigmented band or zigzag line. Small hemorrhages of the ciliary region were noted in 21 cases of chronic alcohol intoxication (22%). They are present in 50% of the cases of central scotoma. Isolated or disseminated white or pigment deposits in the ora serrata were noted in acquired and congenital syphilis and in tabes. They may form a single or double circle throughout the entire ciliary body. Atrophic spots are noted in senility and with beginning cataract. Characteristic changes were found in albuminuric retinitis, choked disc, retinitis pigmentosa, detachment of retina, and injury, consisting in the last case of a rupture of the choroid in the region of the ora serrata. BERGER.

RETZLAFF (155, **Diagnostic significance of pupillary rigidity in nervous and mental disease**) considers the loss of the light reaction an important point in the diagnosis of paresis and tabes, occurring in 50% of the former, and 80% of the latter, as an early symptom, which may precede the appearance of all other signs by ten years or more. It occurs, also, in 20% of cases of cerebro-spinal lues, occasionally in alcoholism,

focal disease, and injury of the skull, in epileptic and hysterical attacks, uræmia, certain intoxications, acute infectious diseases, glaucomatous states, and contusion of the globe.

Birch-Hirschfeld (156, **Action of X-rays on the human eye**) examined two eyeballs which had been subjected to the action of the X-ray before enucleation. Cavities were found in various layers of the retina, with vacuolization and chromatolysis of the ganglion cells and degeneration of small vessels. This is taken as proof that the X-rays and radium have a destructive effect on the eye, and that the latter must be carefully protected while these agents are being used in its vicinity.

Hertel (157, **Experimental and clinical study of phototherapy in ocular disease**) treated 47 cases of ulcus serpens corneæ with local phototherapy: 25 were cured, 3 required Saemisch operation, 2 perforated spontaneously, 4 cases which had gone on to perforation before light treatment had been instituted were brought to a standstill with adherent leucoma. In the remaining 13 cases the process went on from bad to worse in spite of phototherapy, cauterization, and paracentesis.

Erb (158, **Subconjunctival saline injections**) produces local anæsthesia and analgesia in subconjunctival saline injections by instilling 1 or 2 drops of a 10% solution of dionin, followed after a few minutes by a like amount of 4% cocain.

Torok (159, **Treatment of ocular tuberculosis with T. R.**) reports the results of treatment with tuberculin (T. R.) at the university eye-clinic in Buda-Pesth: 5 cases of tuberculosis of the sclera were cured, 2 improved; 2 conjunctival cases were cured, 2 improved, 1 unimproved. One case of tuberculous iritis was cured, and 1 unimproved. The initial dose was 1:1000 *mmg.* gradually increased, injected alternately into the right and left upper arm. Patients were put to bed only in case of marked rise of temperature. General condition was noticeably improved in a number of cases. Premature interruption of the treatment was followed by almost immediate change for the worse. Hypo abscesses and high fever were noted in one or two cases, but the latter

symptom was always followed by improvement in the ocular condition. TREUTLER.

KUBLY (160, **Bier's hyperæmic method**) applied Bier's treatment by hyperæmia suction in 30 cases of stye and marginal lid abscess and in 15 cases of cellulitis of the sac. At the same time the usual methods were used. Small superficial incisions were made over the infected area. In the first class of cases the application of suction glasses was attended with mechanical difficulties, but relieved pain and promoted healing. In sac affections the application was much more simple and the good effect more striking. HIRSCHMANN.

FISCHLER (161, **Benefits and dangers of alcohol injections in neuritis and neuralgia**) calls attention to the danger of nerve degeneration after injections of alcohol for the cure of neuritis and neuralgia.

CALLAN (162, **Operations for secondary cataract**) cuts through thin membranes with a knife needle, avoiding tough bands on account of traction on the ciliary processes. He does not approve of the use of two needles as the process is essentially tearing. De Wecker's scissors are the most generally useful, combining the minimum risk with the maximum benefit. ALLING.

RAY (163, **Loss of vitreous in cataract extraction**) believes that loss of vitreous in cataract extraction adds to the dangers of infection as well as iridocyclitis during the stage of healing. The material taking the place of the lost vitreous is probably aqueous and the whole contents of the eye becomes fluid and at times goes on to opacities. Fibrillary bands are formed leading to retinal detachment and atrophy. ALLING.

REBER (164, **Present status of preliminary iridectomy in cataract extraction**) finds that of 83 American ophthalmologists 47 favor preliminary iridectomy in all cases as the safest method. Nineteen advise it in the presence of complications and 17 look with disfavor upon the preliminary operation. BLAKE.

WEEKS (165, **What stage in the development of senile cataract is most suitable for extraction?**) sums up the question of the earliest advisable time for extraction as follows: In equatorial (cortical) cataract, as soon as liquor Morgagni appears between the lens and its capsule. In cortical (chorioi-

dal), as soon as vision is reduced sufficiently to prevent pursuit of ordinary vocation. In nuclear forms, when useful vision is lost and the lens appreciably shrunken. In zonular cataract, when useful vision is abolished. BLAKE.

GREEN (166, **Extraction of cataract in capsule by external manipulation**) did 22 extractions, in unselected cases, by the Indian method with loss of vitreous in 35%, glaucoma following in 15%, and iritis in 20%, with average resulting vision of $\frac{8}{10}$. He thinks the method is not suited to all cataracts but in carefully selected cases it is a desirable one. It requires more skill than the extraction with capsulotomy, is not suited to the very old or feeble, and is more often accompanied by loss of vitreous. BLAKE.

SNELL (167, **Inquiry into alleged frequency of cataract in bottle makers**) states that the frequency of cataract among bottle makers has often been asserted, especially by German writers. This undue frequency has been connected with the great heat which bottle makers have to face and to the profuse sweating which it causes. W. Robinson (*Brit. Med. Jour.*, Jan., 1905) found that out of 75 hard cataracts extracted in one year 18 were in bottle finishers. Snell finds that the steel works of Sheffield do not furnish an undue proportion of cataracts. He visited a bottle factory and was given every facility. He questioned the men and examined a large number with the ophthalmoscope, but without a mydriatic. About 300 persons were employed. The employees could only tell Snell of one man aged 60 who had gone away to be operated upon for cataract. Snell then questioned the men individually, but none would admit bad sight. The ophthalmoscopic examination of several men including ten *finishers* revealed no case of obvious cataract. All the men agreed that *gathering* and not *finishing* was most trying to the eyes. Snell then addressed letters to fifteen factories enclosing a form to be filled up. Replies were received from nine firms. All the answers with one exception denied that any case of cataract had been known in the works. One firm knew of one case only. Snell can find records of only four cases in his notes for six years. It has been asserted that cataract is disproportionately frequent among the *finishers*, but these are the best paid, most skilful, and older men, and

they have risen to the rank of finisher after long service. Hirschberg, in order to support his view that heat causes cataract, states that cataract forms at an early age in India. This is not the case. The figures from Brockman are as follows: Age 21–30, 158 cases; 31–40, 607; 41–50, 1765; 51–60, 1987; 61–70, 671 cases. The length of life of Indian natives is short, so Hirschberg's contention cannot be supported. Snell decides that in England cataract is not more frequent among bottle makers than among workers in other trades. T. Harrison Butler.

Williamson (169, **Major Smith's operation for extraction of cataract**) writes an appreciative account of Smith's extraction in the capsule after having seen him perform the operation 200 times. He is convinced that other surgeons do not perform Smith's operation as Smith himself does. Major Smith selects his patients himself at Jullunder and they are usually operated upon within an hour or so of their arrival, often from a distance. The face and eyelids are washed in 1 : 20 carbolic lotion, and instruments which cannot be boiled are soaked for an hour in a similar lotion. Above the table hangs an irrigator holding some gallons of 1 : 2000 perchloride lotion. The eyelashes are not cut, 4% cocain is instilled. The fornices are well douched out with perchloride lotion. Smith uses a special speculum with moderate spring and no cross bar. He holds the conjunctiva close to the cornea and gives the fixation forceps a half twist to secure a good grip, and avoid tearing the conjunctiva. The knife is entered *1mm* above the horizontal diameter and emerges at the corneo-scleral junction, or about *2mm–2.5mm* from the limbus. If the Graefe be passed to the heel the section can be completed in one sweep of drawing back the knife. Smith always uses his right hand, and never saws the knife. The speculum is now removed. The upper lid is lifted by a large blunt hook held by the assistant's left hand while the thumb of his right hand draws the lower lid down. It is essential that his hold be not relaxed otherwise the patient may screw up his eye and vitreous will be lost. The little finger of the assistant's left hand pushes up the *orbicularis muscle*. His two hands at the same time fix the patient's head. A strabismus hook is better than a Desmarres re-

tractor for holding the upper lid. The operator with a flat spoon or vectis held in his left hand assists the assistant in holding up the upper lid. With his right hand he places the convexity of a strabismus hook upon the cornea over the junction of the lower with the middle third of the lens. This is not altered in position till the lens is half way out. The pressure is directed to the back of the eye, and at first is not towards the wound. When the lens is half out, the hook is shifted to tilt the lens into its concavity. The pressure exerted is moderate, slow, and *continuous*. It must be slower than in an ordinary extraction. The continued pressure tires out the iris which relaxes. If the capsule burst, it should be drawn out with forceps. The patient is not asked to look down, so his eye is generally turned up. This is awkward for the surgeon *but is the position of greatest safety for the patient.* The iris if prolapsed is replaced. No atropin is used. The bandage is not undone till the fourth day unless there be pain. If vitreous escape, the vectis is inserted and used *to hold the lens forwards* while it is extracted by pressure. It is not used, as by Pagenstecher, to *extract.* The vitreous is cut off level with the cornea. Smith after extracting 14,000 lenses in the capsule thinks that slight loss of vitreous is of no consequence. He thinks that if he selected his cases he could keep it down to 2%.

T. Harrison Butler.

Elliot (170, **125 cases of posterior dislocation of the lens by native operators—couchers**) remarks that Hirschberg in the *Centralblatt für Augenheilkunde* (Feb., 1904) gave his views on "The cataract pricking of the Hindus." He was handicapped by his ignorance of the Indian native. Maynard (*Ophthalmic Review*, April, 1903) published 63 cases collected in India. He found that 61.9% had retained good vision for an average period of 4.88 years, and he supports Power's conclusions, that under certain circumstances "depression" would be allowable (*B. M. Journ.*, 1901, p. 1260). Castillo y Quartelliere comes to a similar conclusion. Major Henry Smith (*Trans. Ophth. Soc. U. K.*, 1904, p. 264) thinks that couching should not be practised by the profession at all. Elliot asks two questions: What are the real results of couching by natives? Is the operation ever justifiable in the hands of a

reputable ophthalmologist? As regards the second question, the answer is emphatically "*No.*" The author after extracting 4000 cataracts can think of no case where reclination would have been preferable to extraction. He can imagine no condition which would lead him to perform such an unsound and unscientific operation. The results are set out in an exhaustive analysis which can be summarized as: Successes 23.3%; partial successes 8.0%; failures 68.8%. The causes of failure are: Irido-cyclitis 52 cases; glaucoma 17 cases; imperfect dislocation of the lens 13 cases; detached retina 2 cases; vitreous opacities 1; optic atrophy 1; total 86 cases. Iritis was found to have been present in many of the partial successes. Elliot thinks that in addition to the failures many shrunken eyes were due to couching, although operation was denied. Elliot has not seen the "slow and steadily progressive degeneration of the vitreous and retina" described by Smith. Some of the failures experienced return of vision for some time after the operation. The writer of this review after four years' ophthalmic practice in Palestine, where "couching" by a native *hakim* is much in vogue, is able to state that the results of the operation are precisely as stated by Major Elliot. The operation is generally performed with a sharp thorn inserted behind the limbus, and the Arab invariably denies the operation.

T. Harrison Butler.

Henderson (171, **Histological study of healing of wounds after cataract extraction**) has examined histologically 33 aphakic eyes. In 21 death had supervened in from three days to a month after the operation. In 4 the eyes were enucleated for pain and secondary glaucoma, and 8 specimens were obtained from autopsies; 15 were operated upon by the modern flap operation with iridectomy, 4 were simple extractions, 13 were operated upon by Graefe's method, and 1 was an example of Jaeger's operation made with a hollow-ground concave knife.

The method of healing of pure corneal wounds is not the same as that of scleral or corneo-scleral incisions. In the latter case the regenerative process is modified by the subconjunctival tissue.

A corneal incision heals by *mediate union* followed by *primary*, and finally *permanent union*.

Mediate union is brought about by a fibrinous exudate which glues the edges together where they approximate most closely. This is sufficient to retain the aqueous. The fibrinous plug is probably chiefly derived from the aqueous, which after paracentesis contains albumen and fibrin.

Primary union.—This is effected by the surface epithelium and the endothelium. The cells of the epithelium grow down the lips of the wound and meet over the fibrinous plug. The endothelium can reach the anterior chamber. In two cases the epithelium had blocked the filtration angle and given rise to glaucoma. This has happened four years after successful extractions.

Permanent union.—This is brought about by a slow and gradual growth of corneal fibres, which by their pressure cause the fibrinous plug to disappear, and in from two to three months give rise to firm cicatrization.

Limbal Incision.—*Mediate union* is the same as in a corneal incision.

Primary union is brought about by a down-growth of the subconjunctival tissue, especially from the scleral flap. Newly formed blood-vessels are to be seen in this down-growth. The endothelium grows over the inner surface of the wound, and seals it.

Permanent union is effected by a slow replacement of the connective-tissue cells of limbal origin, which lie with their long axes parallel to the wound, by cells whose long axes run parallel with the corneal lamellæ. The final cicatrix is broader and more distinct than that following a corneal incision. The scleral tissues are relatively inactive, probably owing to the absence of blood-vessels. The subconjunctival tissue may enter the anterior chamber in cases where the capsule has prolapsed into the wound and can form a mass at the iridic angle. The fibrosis and contraction of this mass may bring about secondary glaucoma.

Descemet's membrane is laid down again by the endothelial cells.

Henderson makes some interesting remarks upon post-operative astigmatism. The paper is illustrated by micro-photographs and diagrams. T. Harrison Butler.

The patient seen by Stillson (172, **Cataracts produced by**

shocks from commercial electric currents) received an alternating current of 30,000 volts in the left temple and on the left thigh. There developed a punctate cataract in each eye, worse in the left. The author finds only three similar cases. Such changes have been reported from lightning stroke. BLAKE.

ALT (173, **On rupture of Descemet's membrane due to high intraocular pressure**) thinks that high pressure alone will not account for this and that the softer tissues of childhood and disturbed nutrition favor its production. He reports the case of a baby with glioma retinæ. Sections of the enucleated eye showed, beside the tumor, ruptured ends of portions of Descemet's membrane. The broken ends were covered over with endothelium, proving that they were not recent, and the membrane had reformed at the points of rupture. Bowman's layer was wanting opposite these breaks.

BLAKE.

Microscopically, ALT (174, **Microscopical examination of a globe in thrombosis of the cavernous sinus**) found obliteration of Tenon's capsule and adhesions of the orbital tissues to the globe. At the posterior pole there was an abscess in the sclera, containing pus and a few giant cells. The chorioid was enormously infiltrated with lymph cells. There were hemorrhages in the retina, and the optic papilla was changed to dense connective tissue. BLAKE.

RISLEY (175, **Surgical treatment of glaucoma**) presents case histories to represent various phases of the disease which he believes to belong to the same category as inflammatory glaucoma. He advises early iridectomy as the only surgical procedure. ALLING.

LAGRANGE (176, **Production of a filtering scar in chronic glaucoma**) demonstrated his method of producing a filtering cicatrix at the Oxford Ophthalmological Congress. The present report is illustrated by four beautifully clear engravings which fully explain the procedure.

Lagrange makes a scleral incision with a Graefe's knife finishing with a conjunctival flap. He then with a very sharp pair of slightly curved scissors cuts out a crescentic piece from the corneal lip of the wound. *A small iridectomy completes the operation.*

Lagrange presented twelve drawings showing various kinds of cicatrices resulting from his operation. He has already had thirty-three successes.

Lagrange's operation is much easier to follow than Major Herbert's which aims at a similar result, and if a filtering cicatrix can be obtained Lagrange's method seems to us to be better in every way than Herbert's. We are, however, inclined to agree with T. Henderson that these cases are cured by the small iridectomy which accompanies them and that the cicatrix if free from iris must be sealed up by the endothelium. We have quite recently produced a filtering cicatrix afte ran extraction, but at the end of three weeks it ceased to filter, and the wound healed soundly.

T. Harrison Butler.

Henderson's (177, **The histology of iridectomy**) papers on the "Histology of Iridectomy," and on the "Healing of Corneal Wounds" are of great importance to the controversy between himself and Herbert with reference to the possibility of making a non-fistulous filtering scar, the "so-called" filtering cicatrix.

The iris under the microscope after iridectomy may show an extraordinary amount of trauma accompanied by no evidence of inflammatory reaction. It is a peculiar and unrecognized fact that the iris tissue is indifferent to trauma as such so long as it is not subjected to toxic or septic agencies. Under normal circumstances the iris tissue undergoes no reparative processes, no scar is formed when its tissue is divided or torn, no connective tissue is laid down when it is pulled out of its attachment to the ciliary body, and no reaction follows hemorrhages into its substance. With the single exception of the absorption of extravasations the iris tissue appears years after an iridectomy exactly as it did immediately after its performance; for the cut surfaces remain as when first severed—the so-called anterior epithelium having no tendency to cover it, or the pigment layer to grow over it, and no wandering cells cover its surface with connective tissue. In short the severed iris tissue forming the base and pillars of the coloboma always remains an open, raw, and unhealed area in free and open communication with the aqueous of the anterior chamber. The same is true of

the pars iridica retinæ, which is never regenerated, and remains in the same state years after iridectomy as immediately subsequent to the operation.

In a subsequent paper which has already been abstracted in these ARCHIVES Henderson points out that it is in virtue of these facts that iridectomy is so successful in acute glaucoma; a permanent drain is opened up for the aqueous to transude into the circulation. If, however, the iris stroma be atrophic, as in many cases of chronic glaucoma, the iridectomy is often unsuccessful.

In the same paper he observes that both Lagrange and Herbert in their operations to form filtering scars also perform a small iridectomy. It is this iridectomy which cures the disease and not the scar, which Henderson states can never remain a filtering area, for the endothelium covers it and effectually seals it.

T. HARRISON BUTLER.

HENDERSON and LANE-CLAYTON (178, **Study of the ciliary epithelium after puncture of anterior chamber**) says that the aqueous humor might be formed by secretion or filtration. Starling and Henderson have shown that the fluid is probably a simple transudate, but there may be also an active secretion which produces certain substances quite apart from the actual fluid formed by filtration.

The normal aqueous only contains a trace of proteid, but that secreted after paracentesis contains 5% of albuminous material and is capable of spontaneous coagulation. This fluid is absorbed with difficulty from the anterior chamber, and so the proper tone of the eye is maintained till repair is complete.

All secretory processes in the body are associated with granule formation, which granules are discharged from the cells during activity. If then this excess of proteid in the aqueous after paracentesis be due to a vital process, a secretory act, we ought to find these granules in the cells of the ciliary body. Henderson and Lane-Clayton have failed to find them.

They used albino-rabbits for their experiments. One anterior chamber was drained with a canula, for a period which varied from twenty minutes to an hour and a quarter.

Half an hour was the best time. Then both eyeballs were excised, and sections cut of the ciliary body. Galeotti's method of staining yielded the best results.

The cells of the epithelium showed changes which were rather those of diminished function and of disintegration than of increased vital activity and secretion.

The epithelium cells in the normal eye were only one layer thick, in the drained eye there were more than one layer. No granules were present, but the protoplasm itself seemed to be streaming outwards, and some cells were disintegrated.

The authors think that the alteration in the fluid can be explained as follows: Under diminished intraocular tension there is a dilatation of the ciliary vessels, and in consequence an increased transudate of lymph. This accumulates in cystic spaces under the epithelium, and these burst. The same lowered tension causes disintegration of some of the cells, and some of the protoplasm passes into the fluid. It carries with it some thrombokinase which reacts with the thrombogen in the exuded lymph and causes a fibrinous clot to form on the deep aspect of the ciliary body.

Reik (179, **Is eye-strain ever an etiological factor in epilepsy?**), in support of the claim that *eye-strain may cause epilepsy*, offers four cases in which the attacks ceased after the correction of errors of refraction. All of the patients were under 21. Blake.

Moulton (180, **Staining from argyrol employed in diseases of the conjunctiva and lachrymal apparatus**) produced a brownish staining of the region of the lachrymal sac and the cheek by the introduction of four drops of 25% argyrol into the canaliculus. In the same strength the instillation of one drop three times daily for three years into the conjunctival sac led to argyrosis. Blake.

Conner (181, **Does the opacity of incipient cataract ever regain transparency?**) sums up his study as follows: 10 observers report 23 cases in which they have seen striæ of incipient cataract disappear. Twenty-six report 84 cases in which they have seen diffuse opacities regain transparency, 14 have seen 33 cases regain partial transparency. It seems therefore justifiable to believe that opaque striæ with or without ad-

jacent lens opacity have been known to disappear, although this is a rare occurrence. ALLING.

Of 78 offspring in the family, reported by STIEREN (182, **Atavistic descent of congenital cataract through four generations**), there were 17 males born with cataractous lenses. The descent of the cataracts was in each case indirect as all of the children so affected died early. The transmission was always from mother to son. Each daughter, with one exception, gave birth to one or more blind males. As far as was known there was no family taint. BLAKE.

DEUTSCHMANN (183, **Treatment of detachment of the retina**) observes that in recent times operative treatment has become more popular. Wernike states that 24% of all cases are cured by operation. The results of "passive treatment" are bad, one should therefore prefer operative methods. Those suggested are (1) *Scleral puncture*—results not encouraging, but puncture by galvano-cautery the best. (2) *Drainage* by de Wecker's method—now obsolete. (3) *Puncture of the retina itself* according to v. Graefe—no good results. (4) *Electrolysis*—yield no certain result. *Iridectomy*—purposeless. (5) *Intraocular injection of iodin*—abandoned by its originators. (6) *Cauterization of the sclera* with or without subsequent subconjunctival injection of sodium chloride—insufficient. Deutschmann adopts two methods. A simple one—bisection, "*Durchschneidung*"; and one reserved for severe cases—the injection of sterile animal vitreous body into the diseased human eye. The simple *bisection* is made with a two-edged knife as a rule downwards, never *upwards*. One must wait till the subretinal fluid has gravitated downwards. The knife is directed tangentially to the eyeball, inserted downwards and outwards in the anterior boundary of the cul-de-sac and the eye incised horizontally so that the counter puncture lies directly opposite. At the place where the knife emerges the conjunctiva is not pierced. On withdrawal the knife is slightly twisted so that the subretinal fluid can escape. It is somewhat difficult to quite grasp Deutschmann's meaning, but the above directions are given almost verbatim from the paper. The operation can be repeated at intervals of from 10–14 days.

For the second method of operating Deutschmann uses a special glass syringe, and a double-edged knife canula. Sterilized calf vitreous is employed which is supplied in two forms, one having the stronger action. An incision is made with a double-edged knife in the region of the ora serrata, and some animal vitreous injected with the glass syringe; or if the double-edged knife canula be used the knife can be dispensed with. Weak preparations of vitreous must be used at first, but the operation can be repeated with stronger ones. The reaction can as a rule be controlled by atropin and warm applications. This operation must be regarded as a last resource in almost hopeless cases.

Deutschmann has treated 67 such eyes with animal vitreous; 3 were cured, 26 more or less improved, 38 uncured. The rationale of the operation is by mechanical pressure to squeeze the retina back into place, and by causing some inflammatory reaction to weld it in place. Taking both operations together Deutschmann claims 25% of success.

T. Harrison Butler.

Birdwood (184, **Krönlein's operation for orbital sarcoma**) performed Krönlein's operation upon an Indian native at Agra. The tumor had been growing for two years and was pushing the globe forwards, upwards, and inwards. There is some chemosis, and a vascular keratitis over the lower third of the cornea due to exposure. Patient is in great pain. V = fingers counted, but no view can be got of the fundus. There is a faint red reflex. Krönlein's operation was performed in the usual way, but the incision had to be enlarged to the external canthus, and for a short distance across the conjunctiva. The case did well, the eye eventually returning to its original position. Chemosis of the inferior conjunctiva yielded to incisions and pressure. There was some ptosis, but it was gradually diminishing when the patient was discharged. The corneal haze was clearing up. There is no note of the power of movement of the eye, nor is the question of recurrence touched upon. We are not told what the final vision was.

Birdwood states that his case is the fiftieth on record.

T. Harrison Butler.

Evans, J. J. (185, **Lachrymal sac in the economy of vision**)

states that the mechanism by which the tears are removed from the eye is still a matter of dispute. In order that the process may be satisfactorily carried out the following conditions seem to be necessary:

The edges of the lids must be lubricated by the fatty secretion of the tarsal glands. The puncta must be closely applied to the eyeball, and there must be no paresis of the orbicularis, particularly of the tensor tarsi. The elastic fibres in the walls of the lachrymal sac and canaliculi must have their elasticity unimpaired. The mechanism acts as follows: By the contraction of the orbicularis which takes place in blinking the lachrymal sac is distended and tears are aspirated from the conjunctival sac. The elasticity of the sac forces the tears down into the nose. But tears are not normal, and the functions of the eye are carried out in the absence of the lachrymal apparatus, whether congenital or after operation. In contradistinction an occluded sac is very dangerous. The sac becomes distended with fluid which decomposes and forms a nidus for micro-organisms. A condition of atomy of the sac results and tears are no longer forced down the duct, even if it be widely patent. The most common organism found is the pneumococcus, then the xerosis bacillus, ozæna bacillus, and the staphylococcus come next in frequency. When an acute phlegmon forms, the streptococcus, bacterium coli, or bacillus pyocyaneus may be present. Evans finds that in most cases of post-operative suppuration a mucocele has been overlooked. Hypopyon ulcer is the most common cause of loss of sight in adult working men. Over 100 cases are yearly seen at the Birmingham Eye Hospital. The proportion of men to women is 5:1. In 85% of them there is serious loss of sight. In 50% of these serious ulcers dacryocystitis is present. 95% of the hypopyon ulcers are caused by the pneumococcus. The fons et origo of these cases is often a diseased lachrymal sac. The only means of curing a chronic dacryocystitis is by extirpating the sac. In Evans's experience no epiphora results. Should troublesome epiphora remain, the lachrymal gland can be excised with no danger to the eye which is sufficiently moistened by accessory glands. The old treatment by probes, styles, and lavage is not satisfactory. Evans has seen cases in

which it has been carried out for ten and fifteen years without effect. T. Harrison Butler.

Stephenson (186, **Calmette reaction in ophthalmology**) gives his personal experience of the conjunctival tuberculin test reaction. He holds it a simple, trustworthy, and efficient means of recognizing the existence of tubercle in any part of a patient's body. In many diseases, chronic irido-cyclitis, scleritis, and chorioiditis, whose tuberculous origin is open to question, the new reaction will enable us to decide between syphilis and tubercle as the cause. *Phlyctenular conjunctivitis and keratitis.* The tuberculin was applied to six children, only two manifesting tubercle elsewhere. All gave a positive reaction. A negative result was obtained in a recent case of phlyctenular keratitis. Aubasch and Lafon elicited the reaction in 4 healed cases of this disease. *Chorioiditis.* The test was used in three cases free from evidence of syphilis. In none was there clinical evidence of tubercle. All gave a positive reaction. *Interstitial keratitis.* Of 8 cases 5 were obviously of specific origin. The other 3 gave the Calmette reaction. *Episcleritis.* One case was tested and reacted, two others gave no result. The positive example had some enlarged glands. A case of *obvious tubercle of the iris* gave a strong reaction. *Tubercle of the cornea.* A case of this disease secondary to disease of the iris and ciliary body showed improvement to treatment with tuberculin injections. The sound eye reacted to Calmette's tuberculin. *Chronic irido-cyclitis.* A case is cited at length: The aqueous humor was examined but no *Treponemata pallida* or tubercle bacilli found. Calmette's reaction was obtained. A second patient gave a reaction, and later a few acid-fast bacilli were detected in the aqueous humor.

T. Harrison Butler.

M'Gillivray (187, **Uses and limitations of argyrol in ophthalmic practice**) bases his opinions not upon bacteriological research, but upon three years' clinical experience. From the bacteriological standpoint argyrol is inferior to nitrate of silver, but those who have used it clinically are enthusiastic in its praise. It is a synthetic product containing 30% of silver in combination with a proteid from wheat. It is compatible with alkaloids. Old solutions decompose and

cause irritation. M'Gillivray uses it in 10% and 25% solutions; he finds that its application is painless, in contradistinction to protargol and silver nitrate, which latter he states in 2% solution "is attended with such excruciating pain as to make the strongest shudder!"

In ophthalmia neonatorum the eyes must be constantly irrigated, a teapot is a good substitute for a douche, and some half-dozen drops of 25% argyrol solution instilled. This is repeated every hour during the day. Recovery will be more rapid than if 2% solution of silver nitrate be used once a day. The lids need not be everted to instil argyrol, as is necessary with silver nitrate, a proceeding in the hands of the unskilled, fraught with grave danger to the cornea. M'Gillivray has found this treatment very successful, and "corneal ulceration has not been seen since he adopted it."

Blenorrhœal conjunctivitis is a rare disease in Dundee, M'Gillivray has seen only two genuine cases in the last three years; the same treatment was successfully adopted.

Simple catarrhal conjunctivitis. No remedy compares with argyrol in efficiency and convenience. Should the disease become chronic argyrol is useless and one of the older collyria should be tried.

Chronic conjunctivitis. Argyrol is of little use here.

Corneal ulceration. In simple ulcers argyrol is very useful; the same is true of catarrhal ulcers. In sloughing ulcers it is thoroughly disappointing. It is also useless when the ulcer is caused by pneumococci. It is of no value in phlyctenular keratitis. It is of no use in follicular, granular, or diplobacillary conjunctivitis.

Tear duct affections. M'Gillivray uses a 10% solution instilled into the conjunctival sac, the lachrymal sac being squeezed to draw the solution in. Should this fail he passes No. 2 Bowman's probe into the nose. The use of Anel's syringe is inadvisable, the mucous membrane may become abraded and fluid may pass into the subcutaneous tissue, causing permanent staining of the lids.

Argyrol may be used preparatory to operations in 25% strength. In *blepharitis* argyrol is inferior to other drugs.

In conclusion M'Gillivray thinks argyrol one of the most

valuable remedies we have; it cures without pain to the patient and without trouble and anxiety to the surgeon.

T. Harrison Butler.

Davis (188, **Protest against the employment of paraffin injections near the eyes**) bases his condemnation on two cases. The first was one in which paraffin was injected at the root of the nose to correct deformity. Swelling of the lid occurred immediately after the injection and was followed by marked inflammatory reaction. After this subsided ptosis remained, which was relieved by dissecting out the paraffin. In the other case a paraffin ball was inserted in Tenon's capsule after enucleation but it later made its way through the capsule into the orbital tissue at the apex and produced sympathetic irritation in the other eye. On removal of the foreign substance the irritation subsided. The author speaks further of the dangers of embolism, instances of which have been recorded. Alling.

As medical treatment was of no avail in Derby's (189, **Ligation of common carotid for malignant recurrent vitreous hemorrhage**) case, the right common carotid was ligated. Improvement in vision began at once going from $\frac{3}{60}$ to $\frac{6}{30}$ in the right eye. But on the nineteenth day fresh hemorrhages occurred and the vision fell to counting recorded fingers at one foot. In spite of this experience and a recorded mortality from the operation varying from four to ten per cent. the author recommends the operation in selected cases.

Bull (190, **Value of tuberculin as a diagnostic and therapeutic agent**) believes tuberculin, T. R., to be a valuable diagnostic agent. The positive test should be an undoubted constitutional reaction, consisting of a sudden rise and fall of temperature accompanied by chilly feelings, together with a local reaction in the eye affected. If a focus exists in the lungs there will be an afternoon rise of temperature and cough. Its value as a therapeutic agent is not as evident, but chronic tuberculosis of the chorioid and retina may be benefited. He concludes that it is important to continue injections for several months, using small, gradually increasing doses. The cases he reports are as follows: Four of the eyelids, three of the conjunctiva, one of the cornea, and two of the iris. Alling.

Milligan (191, **Spirochæta pallida in affections of the eye**) gives an account of the discovery of the organism by Siegel and Schaudinn. He states the conditions in which it has been found, and then describes the spirochæta pallida, and the methods adopted for demonstrating it. He concludes that it is practically certain that the spirochæta pallida is the specific cause of syphilis. Stephenson analyses the results so far obtained. The treponema has been discovered in the apparently healthy eyes of fœtuses and of infants who have died of congenital syphilis. It has been discovered in lesions set up in the eyes of animals by the inoculation of syphilitic material. It has been detected in actual syphilitic invasions of the human eye. The conclusion is that Schaudinn's organism is the cause of syphilis. In his papers on *keratomalacia*, he describes the disease as a grave corneal affection apt to supervene in babies whose vital resistance has been lowered by general illness, such as congenital syphilis, tuberculosis, gastritis, etc., and which is identical with "Hikan" an epidemic disease in Japan. No particular micro-organism has been found responsible for the corneal necrosis, although many and various kinds are present. The four cases are cited in some detail. The cornea was scraped and smears stained by Giemsa's and the Proca-Vasilescu methods. The latter yielded the clearer microscopic pictures.

T. Harrison Butler.

Rollet (192, **Cure of hypopyon by drainage of anterior chamber with a horsehair**) finds that after a Saemisch section the wound is liable to early closure and has to be opened by a probe. He observes that a general surgeon drains an abscess cavity, and describes an operation he has devised to drain a hypopyon. He passes a Graefe's knife into the anterior chamber at a spot on the limbus equidistant from it and a normal pupil. It emerges at a corresponding point on the opposite side. The knife is then withdrawn. A piece of sterilized horsehair is now threaded through the punctures and left in situ for 48 hours. The pus emerges by capillarity, and the ulcer heals. Rollet has published 17 cases in the *Revue General d'Ophtalmologie*, Nov. 30, 1906. Slight cases the author treats by subconjunctival injections of mercury salts,

but where there is much pus he evacuates it by surgical methods.

T. Harrison Butler.

Darier (193, **Atoxyl in ocular syphilis**) first used atoxyl in ocular syphilis in iritis in a man with pronounced general syphilis and condylomata of the iris, injecting 5*cc* of a 10% solution of atoxyl deeply into the gluteus maximus. Two days later 0.8 gramme set up nausea and violent colic. On alternate days therefore 0.30 grammes were injected into the veins. In 14 days the patient received seven injections amounting to 2.80 grammes of atoxyl. The treatment was followed by rapid improvement. In a second case mercury was injected in large doses with no result, but when atoxyl was substituted improvement was noticed. 0.5 was first injected into the muscles, followed by 0.8 which set up nausea and abdominal discomfort. Next day 0.005 of atoxyl was injected subconjunctivally. 0.5 into the muscles caused renewed discomfort, and so Darier returned to the intravenous injections of mercury and subconjunctival injections of atoxyl. Probably in this case both mercury and atoxyl helped each other. Darier reviews Salmon's results, and concludes: that atoxyl gives constant results in all stages of syphilis; it acts rapidly, at least as quickly as mercury. Salmon uses doses of 0.5 gramme to 1.0 gramme. Atoxyl is little toxic; a syphilitic person received without inconvenience 6.30 grammes in a month. In every-day work atoxyl may be given in doses of 0.5 gramme on alternate days for two or three weeks in solutions of 10%–15%. Hoffman showed three cases in Berlin which had received injections of atoxyl with great benefit. He concluded that atoxyl might be useful where mercury was contraindicated. He had treated 11 cases of which 4 suffered from nausea, gastric disturbance, vomiting, vertigo, and diarrhœa. One developed albuminuria which disappeared when atoxyl was given up, but reappeared later. Darier thinks that atoxyl, mercury, and iodide should be used alternately. He recommends that treatment commence with six injections each of 0.5 of atoxyl. The first three on alternate days, the remainder every three or four days. A new series should be undertaken after two or three weeks. Treatment should not continue too long, for retro-

ocular neuritis has followed the injection of a total amount of 27 grammes of atoxyl. T. Harrison Butler

Dor (194, **Treatment of Graves's disease with thymus**) said that "The phenomena associated with deficiency of the thyroid secretion are well known, but the same could not be said of the character of the group of cases usually classed with exophthalmic goitre." Of all the classic symptoms the exophthalmos is the least constant. The name should be given up and a more general one such as Graves's or Basedow's disease employed instead. Different authors do not agree about the nature of the disease. Basedow sustained the hematogenic theory that there was a change in the blood; Charcot attributed the disease to an alteration of the ganglion cells of the brain cortex; Sattler blamed the sympathetic and vagus nerves; Moebius, 25 years ago, initiated the thyrogenic origin. Tuillant proposed and carried out thyrectomy, but myxœdema resulted, and now a partial extirpation is performed with satisfactory results. Kocher operated upon 176 cases, 9 died, the rest were benefited, and some were cured. Curtis's results are less satisfactory, 14 cases, 4 deaths, 1 relapse. Nine cases improved. Before operation there must be weeks of treatment with iodide of potassium and phosphoric acid. Sympathectomy has given good results. The effect of thyroid feeding is not good, but good results have often followed the use of the serum of ethyroidized goats and calves. The effect of the X-rays is disputed. Alt carried out a *dechlorization cure*, reducing the ingested chlorides to four grammes a day, and curtailing fluid with good effect in some cases. Dr. Owen used thymus extract in mistake for thyroid, and obtained a good result. Dr. Dor and his son followed his example and cured many slight cases of Basedow's disease. Fresh thymus was mixed with meal and salt and worked up into little bullets which were swallowed whole (15–25 and even 100 grains daily). Later Dor replaced the fresh organ by extract of thymus prepared in the usual manner and put up in sealed tubes. He cites cases and expresses himself as satisfied with the treatment in mild recent attacks.

T. Harrison Butler.

A critical study by Oliver (195, **Preventive treatment of transferred [sympathetic] ophthalmia**) of statistics of Wills

Eye Hospital, Phila., shows that in spite of the increase in a number of cases which presented conditions supposed to cause sympathetic inflammation there was a reduction on the proportionate number of such results amounting to an actual decrease of 80%. The causes for the better control of the disease are given under two heads, direct and indirect, and are as follows. Better machinery, more carefully arranged and illuminated factories, compulsory use of the eye protectors, more prompt and skilful attention to injuries. Furthermore the X-ray has facilitated intelligent action, especially in the removal of foreign bodies as well as a general advance in performing operations and in after-treatment. ALLING.

NOYES (196, **Treatment of trachoma with boracic acid powder without massage**) has used boracic acid for trachoma but not as previously recommended with massage. He applies the dry powder by dusting it on to the lid with a camel's hair brush. In the acute stages with corneal ulceration or when there is profuse suppuration it is not so efficient. In the ordinary case from the beginning of the stage of scar formation to the very end it is of great value. ALLING.

PARSONS (197, **Treatment of lachrymal obstruction**) states that this disturbance is caused by inflammation of the nasal duct, and almost always spreads from the nose upwards. Conjunctivitis rarely causes dacryocystitis whereas dacryocystitis invariably gives rise to conjunctivitis. The nose should be examined in these cases. Chronic rhinitis is often present in angular conjunctivitis, and a bacillus identical with the Morax–Axenfeld diplobacillus is present in the discharge. The lachrymal sac and nasal duct are surrounded by a venous plexus, these vessels become engorged and the duct epithelium swells. These two factors occlude the lumen of the duct. Fluid accumulates in the sac and causes passive dilatation; the fluid contains bacteria and cocci and these cause further irritation. The goblet cells secrete an excess of mucus, and a vicious cycle is formed. The mucocele almost always contains pneumococci which are the cause of most hypopyon ulcers. A mucocele is a constant menace to the eye, and if the eye itself escape, abscesses form.

The older surgeons used probes if there was not a patent

duct, after slitting up the canaliculus. No matter how dexterously a probe be passed grave damage is done to the vessels. The epithelium is torn up and often venules are lacerated and hemorrhage takes place. New fibrous tissue is formed which later on contracts, larger probes must be used, and finally a style must be inserted. Epiphora and pus alternate with probes and pain.

The rational method is to carry out a course of syringing with Anel's syringe. Parsons states that provided the duct has never been probed syringing properly carried out cures the majority of cases. If it fails, extirpation of the sac offers a really radical cure. The lower punctum is dilated with Nettleship's dilator and one of Luer's all-glass syringes used. The canula must be introduced into the sac itself, but not into the nasal duct. The sac is to be well washed out with boric or saline lotion once a day. Often fluid passes into the nose in a week or less. After a week a little zinc sulphate grain 1 or grains 2 to the ounce may be used, and a few drops of a 10% to 15% solution of protargol may be left in the sac. When once a free passage has been obtained the sac should be syringed less frequently. In some cases the patient should be taught to syringe his sac himself.

Parsons then gives directions for extirpating the sac. He thinks that it is unnecessary to preserve the internal palpebral ligament.

Mucocele is not uncommon in infants. It is usually very easily cured, for it is due to delay in the canalization of the lachrymal duct. The duct is developed as a solid cord of epithelium, the central cells degenerate, and are cast off. These cells may accumulate and block the lower end of the duct. If simple treatment by squeezing the sac daily does not effect a cure a fine probe may be passed once under an anæsthetic. This is the only condition in which Parsons allows a probe to be passed in his clinic. T. Harrison Butler.

Burdon-Cooper (198, **Argyrosis, and the action of the silver salts**) has studied the action of silver nitrate upon the conjunctiva, and the chemical changes which lead to staining. The stain is due to the chlorine of the soluble chlorides which exist in the intercellular material, and in cell protoplasm, but are absent in normal nuclei. The author, by experiments

upon the rate of penetration into gelatine, egg albumen, etc., has shown "that the rate or penetration of a soluble silver salt into a colloid is, other things being equal, directly proportional to the chlorine in the latter capable of reacting with the silver salt." The depth of penetration depends solely upon the strength of the silver solution. The silver is precipitated in layers. The seat of the stain has been given by Stephenson as in the lymphatics, by Grossmann as in the elastic tissue. The extent to which the nitrate is influenced by the soluble chlorides depends upon the strength of solution. The nitrate is converted into chloride and is decomposed by light either into metallic silver or into argentous chloride, or an oxychloride. Constant use of weak drops is more likely to stain than the infrequent use of strong solutions. The author finds that argyrol and collargol do not react with chlorides and do not penetrate. He has no faith in them as therapeutic agents. Protargol is not included in this condemnation as it reacts with a chloride.

HARRISON BUTLER.

TODD'S (199, **Method of tenotomy allowing limitation of effect as desired**) method of operating is as follows: The tendon is exposed and caught up with a tenotomy hook, and an incision is made across the tendon near the point of insertion involving about one half of the fibres. At a distance of two thirds the width of the muscle a second incision is made on the opposite side in a similar manner. The length of the incisions may be varied according to the effect desired.

ALLING.

WUERDMANN and HOGUE (200, **Treatment of partial optic and retinal atrophy by electricity and massage**) report good results in cases of optic-nerve atrophy due to hydrocephalus, hereditary and acquired syphilis, and the neuro-retinitis of pregnancy, by the use of the galvano-faradic current and massage.

HERBERT (201, **Filtering cicatrix in the treatment of glaucoma. An improved operation**) classifies permeable cicatrices as "cystoid, fistulous, and filtering." A filtering scar is smooth and has no dark points which are fistulæ. Herbert finds that such a scar is common in Bombay after cataract extraction with a broad conjunctival flap. Pressure on such

an eye, even years after the operation, will cause the eye to become soft and gives rise to very distinct chemosis. It is not produced after the subconjunctival operation of Czermak. This is exactly the kind of scar which has long been desired in the treatment of glaucoma.

Herbert began by making one or both lips of a corneo-scleral incision as jagged and uneven as possible. A narrow knife was used. The idea was to produce a weak scar by preventing primary union. On the whole this method proved unsatisfactory. Herbert then tried a small scleral incision with scissors after Lagrange, but found the method uncertain and unsatisfactory. He then proceeded to isolate a wedge of tissue which, being cut off from its blood supply and pushed out of place, acts as a kind of graft which should shrink and provide for filtration. The operation has been performed in all grades and stages of primary glaucoma except the most acute with encouraging results. The incision is small and is made slowly, so the operation is a safe one. An old ground-down Graefe is used with a breadth of $\frac{4}{5}mm$. It must taper from heel to point. The conjunctival incision is made 1.5–2*mm* above the projected incision, the loose fold of conjunctiva being pushed down with the knife point. The corneo-scleral puncture is made with the blade nearly transverse and the cutting edge upwards. When the counter puncture has been made the blade is turned and the puncture and counter puncture enlarged with the cutting edge downwards. This gives room to twist the knife for the secondary incision which is made forward and upward in a direction normal to the corneal surface. The primary incision is then completed subconjunctivally to isolate the wedge. The wedge is quite narrow; its vertical measurement should be $\frac{1}{2}$–$\frac{2}{3}mm$. The conjunctival flap is cut with a narrow undivided bridge. A minute iridectomy, a "peripheral buttonhole," is made to prevent iris encleisis. If there be any tendency to the formation of synechiæ atropin is used freely.

It is hard even in the original with the help of some diagrams to follow the steps of the operation.

T. Harrison Butler.

Butler (202, **Comparative efficiency of nitrate of silver,**

argyrol, and protargol) has carried out an investigation to settle the comparative therapeutic value of silver nitrate, protargol, and argyrol in the acute ophthalmia which every summer exists in Palestine and Egypt as a severe epidemic.

Using the ample material available at the British Ophthalmic Hospital in Jerusalem he came to the following conclusions:

Testing silver nitrate against protargol, protargol proved superior in 66% of the cases, silver nitrate in 10%, and an even result was noted in 24%. Testing protargol against argyrol, protargol was superior in 50%, equal results in 45.5%, argyrol best in only 4.5%. Testing silver nitrate against argyrol the results were about equal. The method employed was to select cases in which the two eyes were equally affected, to treat the right eye with one solution the left with the other, the third drug was given for home use in dilute solution (silver nitrate 1%, argyrol and protargol 5%). For the tests silver nitrate was used in the strongest solution which experience in Palestine has shown to be safe, 2%; argyrol and protargol were used in 33% solutions. The cases were practically all caused by the Koch–Weeks bacillus and varied in severity from simple catarrhal to purulent conditions. None of them contained the gonococcus. The conclusion is that protargol is in every respect the best agent to employ.

T. Harrison Butler.

III.—INSTRUMENTS AND REMEDIES.

203. Schlueter, H. **Comparative study of the action of cocain and novocain.** *Klin. Monatsbl. f. Augenh.*, xlv., No. 2, p. 198.

204. Verderame, Ph. **Experimental study of deleterious action on tissues of novocain.** *Zeitschr. f. Augenh.*, xviii., No. 3, p. 191.

205. Selenkowsky. **Bactericidal action of new silver preparations "Sophol" compared to protargol.** *Prakt. Wratsch*, Nos. 24, 25, 1907.

206. Waterman, O. **Treatment of optic atrophy in cerebral lues with atoxyl.** *Berl. klin Wochenschr.*, No. 35, 1907.

207. Brandenburg. **Use of fibrolysin in ophthalmology.** *Med. Klinik*, No. 50, 1907.

208. Straub, M. **Tincture of green soap for sterilization of instruments in ophthalmology.** *Klin. Monatsbl. f. Augenh.*, xlv., No. 1, p. 542.

209. Monthus. **Glasses and spectacles to absorb ultra-violet rays.** *Soc. d'opht. de Paris*, June 4, 1907.

210. Wessely. **Apparatus for graphic registration of intraocular tension.** *Deutsche med. Wochenschr.*, p. 485, 1907.

211. Koster, Gzn. W. **Esthesiometer for light and color sense.** *Graefe's Arch.*, lxvi., No. 3, p. 506.

212. Polack. **New lamp for ophthalmoscopic examinations.** *Soc. d'opht. de Paris*, July 2, 1907.

213. Marri, E. **Giant magnet in ophthalmic practice.** *Ann. di Ottalm.*, xxxvi., p. 319.

214. Straub, M. **Small angular knives and their use in glaucoma, secondary cataract, and anterior synechiæ.** *Klin. Monatsbl. f. Augenh.*, xlv., No. 2, 218.

215. de Vries, W. M. **Demonstration of micro-stereo-photography.** *Ned. Tydschr. v. Geneesk.*, 1907, Bd. 2, No. 4.

216. Veasey, C. A. **Instrument for testing light reflex of the pupil.** *Journ. Amer. Med. Ass'n*, Oct. 19, 1907.

217. Frank, M. **Parabolic reflector for illumination of test-types.** *Ibid.*, Aug. 3, 1907.

218. Burdon-Cooper, J. **A silk-worm gut lachrymal style.** *Ophthalmic Rev.*, Jan., 1907.

219. Maddox. **The prism-verger; an instrument for the measurement and enlargement of fusion power.** *Ophth. Rev.*, April, 1907.

Schlueter (203, **Comparative study of the action of cocain and novocain**) advises instillations of novocain 10% as an anæsthetic for minor operations on the conjunctiva and cornea. It acts less rapidly, intensely, and lastingly, than cocain and is much less toxic. For filtration anæsthesia in enucleation, and so on, 1–2% solutions with adrenalin were found quite satisfactory.

Verderame (204, **Experimental study of deleterious action on tissues of novocain**) noted injury to the corneal epithelium by 2% solutions of novocain, and marked destruction from the use of more concentrated solutions. It is less effectual as an anæsthetic than cocain. Subconjunctival injections caused marked chemosis, and corneal degeneration. Irrigations of the anterior chamber were followed by intense irritation of the anterior uveal tract.

Selenkowsky (205, **Bactericidal action of new silver preparations; "Sophol" compared to protargol**) made experiments on the comparative bactericidal effect of strong solutions of sophol, and of protargol on B. pyocyaneus and B. staphylococcus aureus, in cultures and nutrient media. The latter chemical was found to be much more efficacious.

There is no reason for introducing sophol into ophthalmic practice. HIRSCHMANN.

WATERMAN (206, **Treatment of optic atrophy in cerebral lues with atoxyl**) used atoxyl without good results in the treatment of optic nerve affections due to specific disease of the central nervous system. The drug is contra-indicated in cerebral lues as well as in tabetic optic-nerve atrophy.

BRANDENBURG (207, **Use of fibrolysin in ophthalmology**) investigated the action of fibrolysin, a combination of thiosinamin and sodium salicylate, using it in injections (0.2*gm*) in cases of corneal opacity following scrophulous keratitis, trachoma, chronic uveitis, and retrobulbar neuritis. In no single case was there any noticeable improvement.

STRAUB (208, **Tincture of green soap for sterilization of instruments in ophthalmology**) recommends the tincture of green soap for sterilization of instruments, as the blades and points are not dulled by this agent.

MONTHUS (209, **Glasses and spectacles to absorb ultra-violet rays**) recommends Montpillard's spectacles and glasses for the absorption of ultra-violet rays by means of a thin layer of dry gelatin with æsculin between the two layers of glass. The spectacles are almost colorless and do not interfere with color perception. BERGER.

KOSTER (211, **Esthesiometer for light and color sense**) describes a modification of Foerster's photometer for the measurement of light perception and color vision, allowing rapid presentation of a small area of color varying while the illumination is gradually raised to the limit of recognition. JITTA.

MARRI (213, **Giant magnet in ophthalmic practice**) gives a review of the cases of injury to the eye by metallic foreign body seen at the Turin clinic, and reviews the history of the electro-magnet and a description of various models. This instrument is of the greatest importance for the preservation of an organ which is essential for social life. The magnet should be part of the equipment of every hospital, dispensary, and first-aid station. CALDERARO.

STRAUB (214, **Small angular knives and their use in glaucoma, secondary cataract, and anterior synechiæ**) has had small angular discission needles and knives made by Moria in

Paris to facilitate puncture or section in any part of the cornea, and particularly for the delicate procedures required in secondary cataract. The blades are attached to the handles at an angle of 60°, the plane of the cutting edge being at right angles to that of the angular bend. JITTA.

DE VRIES (215, **Demonstration of micro-stereo-photography**) has succeeded in making photomicrographs stereoscopic by attaching an eccentric diaphragm to the Abbe condenser and making two exposures, one with the light coming from the left and the second with reversed illumination (Gerhardt's method). JITTA.

VEASEY'S (216, **Instrument for testing light reflex of the pupil**) instrument is devised to facilitate the observation of Wernicke's hemiopic pupillary reflex. It consists of a rubber cone in the centre of which is a long focus convex lens. The tip will fit into the handle of the DeZeng ophthalmoscope, retinoscope, or Würdemann's transilluminator, all of which have electric connections for lamp. Stops are added to cut off aberrant rays and aid in the concentration of light. ALLING.

FRANK (217, **Parabolic reflector for illumination of test-types**) believes that uniform illumination of test types is important and has devised a reflector which accomplishes this result. ALLING.

BURDON-COOPER (218, **A silkworm-gut lachrymal style**) describes a silkworm-gut lachrymal style. He first used it for treating a case of localized tuberculosis at the nasal end of the lachrymal duct. He twists half the gut with artery forceps, so as to flute it like a screw. The end of the twisted part is hammered flat and a piece of silk threaded through the flat part. It is introduced thus: The inner canthus and the inferior meatus are well cocainized, and into the latter is introduced a sponge with a silk thread attached. This is to prevent the style from passing down into the pharynx. The lower canaliculus is slit and a silver probe passed. This is followed by a Galezowski's dilator. The dilator is screwed open and the gut style inserted between its jaws. It needs patience to get it down to the inferior meatus. It is now grasped by forceps and pulled out of the nostril. Next day a knob of sealing wax is fixed to the upper end, which is bent at a right angle, and the knob lies in the slit canaliculus.

The lower end is also supplied with a knob and inserted within the nostril. If a silk style be desired, it is only necessary to draw the style completely through, and leave the silk in situ. The upper end is best attached to a tag of the roof of the slit canaliculus. T. HARRISON BUTLER.

MADDOX (219, **The prism-verger; an instrument for the measurement and enlargement of fusion power**) describes his prism-verger, a spectacle frame fitted with a rotating prism before each eye, one of which is reversible so that both the horizontal and vertical values of "dynamic" vergence may be measured. It is a complement of Stevens's phorometer which it resembles in principle though differing in purpose. In the phorometer both prisms revolve in the same sense, in the verger in opposite sense. The phorometer measures heterophoria which the prism-verger alone cannot do. The phorometer will not measure vergence power, or train the ocular innervations, for both of which the verger is intended. The verger measures vergence power; it enlarges vergence power; it can be used to treat slight squints by exercise; it estimates heterophoria when used in conjunction with the Maddox rod. It is made by Dixey & Sons, London. The paper does not admit of abstraction, and should be consulted in the original which includes a woodcut of the instrument.

T. HARRISON BUTLER.

Sections IV.–VII. Reviewed by DR. ABELSDORFF, Berlin.

IV.—ANATOMY.

220. ELSCHNIG and LAUBER. **On the so-called "clump cells" of the iris.** *v. Graefe's Arch.*, lxv., No. 3, p. 128.

221. DUBREUIL, G. **Lachrymal gland of man and mammals.** *Rev. génér. d'opht.*, xxvi., No. 3, p. 505.

222. LAFON, CH. **Double microphthalmus and a study of Wintersteiner's rosettes.** *Arch. d'opht.*, xxvii., p. 523.

223. LAGLEYZE. **The eye of albinos.** *Ibid.*, p. 280.

224. CARLINI, O. **Elastic tissue in the glands of Moll.** *Annali di Ottalm.*, xxxvi., p. 231.

ELSCHNIG and LAUBER (220, **On the so-called "clump cells" of the iris**) consider the so-called clump cells of the iris as derivatives of the pars retinalis, judging by their topographical relations and the results of histochemical and histological

investigations. All larger aggregations of clump cells near the pigment layer of the iris are in communication with it. The protoplasm of the clump cells contains a large round nucleus, and its pigment is identical with that of the pars retinalis, resisting decolorizing and bleaching agents more vigorously than the stroma pigment.

Dubreuil (221, **Lachrymal gland of man and mammals**) describes the lachrymal gland of mammals, the changes in the secretory cells noted during rest of the organ, and the details of function as to collection and secretion of tears.

Berger.

Lafon (222, **Double microphthalmus and a study of Wintersteiner's rosettes**) found Wintersteiner's retinal rosettes in a case of double microphthalmus. He concludes that they are not characteristic for glioma, and that they develop by invagination of the neuro-epithelial layer into those beneath. This process may take place as a result of developmental arrest or, as is usual, in glioma. Berger.

Lagleyze (223, **The eye of albinos**) discusses the pathologic-anatomic and clinical characteristics of the albinotic eye. In heterophthalmus, as shown by Demaria, there was marked thickening of the pigment layer of the iris in consequence of changes in the posterior cell layer. The pigment rarefies so that the pigment layer appears gray, not black. Lagleyze considers the changes in the nature of an œdema of the pigment cells of the pars iridica retinæ. Berger.

Carlini (224, **Elastic tissue in the glands of Moll**) has studied the rôle of elastic tissue in its relation to the glands of Moll. It is very plentiful in the connective tissue surrounding the modified sweat glands of the lid margin, forming a felty layer underneath the membrana propria.

V.—PHYSIOLOGY.

225. v. Tschermak, A. **Relations of antagonistic, compensatory, and contrast colors.** *Pflueger's Arch. f. ges. Phys.*, 117, p. 473.

226. Alexander-Schaefer, G. **Comparative physiological studies on visual acuteness.** *Ibid.*, 119, p. 571.

227. Reiff, H. J. **Explanation of Thompson's optical illusion.** *Ibid.*, p. 580.

228. May, B. **Case of total color blindness.** *Ibid.*, 42, p. 69.

229. v. Szily, A. **Study of motion after-images.** *Ibid.*, xlii., No. 2, p. 199.

230. Simon, R. **Correction of a statement in Dr. May's paper on total color-blindness.** *Ibid.*, p. 154.

231. Raehlmann, E. **Comparative physiology of the eye.** *Ophth. Klinik*, 1907, No. 9–10, p. 257.

232. Scalinci, N. **Studies on the physico-chemical constitution of the aqueous.** *Arch. f. Augenh.*, lvii., No. 2, p. 116.

233. Hess, C. **Dark adaptation and visual purple in fowl and doves.** *Ibid.*, No. 4, p. 298.

234. Hess, C. **Studies on light and color sense of day birds.** *Ibid.*, p. 317.

235. Abelsdorff, G. **Notes on color vision of day and night birds.** *Ibid.*, lviii., No. 1, p. 64.

236. Hess, C. **Extent of the pupillo-motor area of the retina.** *Arch. f. Augenh.*, lviii., p. 182.

237. Dimmer, F. **Human macula lutea and entoptic phenomena connected with it.** *Graefe's Arch.*, lxv., No. 3, p. 486.

238. Gullstrand. **The question of the macula.** *Ibid.*, lxvi., No. 1, p. 141.

239. Isakowitz, L. **Quantitative study of micropsia due to concave lenses. Theory of judgment of distance and size.** *Ibid.*, No. 3, p. 477.

240. Neopen, A. **Reaction of iris tissue to light.** *Acad. des Sciences de Paris*, May, 20, 1907.

241. Dubois, Ch. and Castelain, F. **Study of the motor innervation of the iris.** *Arch. d'ophtalm.*, xxviii., p. 310.

242. Scalinci, N. **Nature and mechanism of production of intraocular fluids.** *Ibid.*, xxvii., p. 391.

243. Fortin, E. P. **Retinal circulation and its influence on certain phosphenes.** *Rec. d'opht.*, xxix., p. 503.

244. Pergens, E. **Studies in visual acuteness.** *Ann. d'ocul.*, cxxxvii., p. 292.

245. Ovio, G. **Observations on Mariotte's blind spot.** *Ann. di Ottalm.*, xxxvi., No. 1–2, p. 1.

Tschermak (225, **Relations of antagonistic, compensatory, and contrasting colors**) characterizes as antagonistic, contrasting, and compensating, respectively, the colors which produce an exactly opposite impression after analysis of the sensation, those which produce each other by simultaneous or successive contrast, and those which combine to produce the colorless impression in mixtures of light. Quantitative measurements by A. Krause show that in daylight adaptation the compensating color differs from the antagonistic in the direction of more blue and red. There is a similar but even more marked deviation of the color of simultaneous and successive contrast from that of the exact antagonist. In certain cases, faint reddish or bluish tone, for example, the

exciting color and the contrast color may show the same weaker component instead of its opposite, weak blue-red exciting weak blue-green, instead of the weak yellow-green to be expected theoretically. After adaptation for a particular color the compensating, and still more the contrasting, color varies from the exact antagonist in the sense of an addition of a certain amount of the adaptation color, indicating that the adaptation to daylight is a chromatic one for red and blue, corresponding, partly to the color of daylight, and, partly, to the effect of absorption by the media of the eye.

Alexander-Schaefer (226, **Comparative physiological studies on visual acuteness**) measured the size of the retinal image of a given object in the eyes of various animals and determined the section of a retinal element by counting the number of the unseparated rods and cones in a unit of space. As acuteness of vision is proportional to the linear size of the retinal image and inversely proportional to the diameter of retinal element, formulæ could be constructed for the vision of various vertebrates. As the retinal image is larger in large eyes than in small ones, it follows that horses and cattle have most acute vision and bats and turtles the least acute vision.

Reiff (227, **Explanation of Thompson's optical illusion**) describes under the heading of Thompson's illusion the apparent rotation about a middle point in a series of concentric circles, when the paper on which they are drawn is made to describe a curve. The apparent motion is due to an error or deception depending on the blurring of a double sector in consequence of the short duration of the light impression. This double sector running around the stationary system of circles gives the impression that the circles are moving along with it, as daily observation has familiarized us with the impression of a moving wheel with apparently stationary spokes.

May (228, **Case of total color blindness**) reports a case of total color blindness in a healthy girl of 15. There was hyperopic astigmatism, with $V=\frac{1}{15}$, increased to $\frac{1}{9}$ with diminished illumination, photophobia, and nystagmus. Fundus normal, except for a yellow spot at the fovea, O. D. No central light scotoma could be detected, but the blind spot was abnormally far (16°) from the point of fixation. Light

sense was normal, the distribution of illumination in the spectrum was characteristic of complete color blindness (maximum at 540 $\mu\mu$) and corresponded to that of the dark adapted eye of a partially color-blind observer (Nagel). With increased dark adaptation there was decrease of the stimulus of green rays as compared with red, a reversal of Purkinje's phenomenon, due to absorption of green light following increased concentration of visual purple.

v. Szily (229, **Study of motion after-images**) studies motion after-images by means of a rotating cylinder with black and white stripes. On rotation there is apparent motion of the stationary objects in an opposite direction when the sensation of motion has been limited to a small part of the visual field, but in the same direction when it has affected a wide arc of the periphery, and also when the entire field has been acted on.

Simon (230, **Correction of a statement in Dr. May's paper on total color-blindness**) notes that in the case of central scotoma with total color-blindness first observed by Koenig, ophthalmoscopic examination revealed a perfectly normal fundus.

Raehlmann (231, **Comparative physiology of the eye**) notes that there is a certain similarity of function, particularly in the periphery of the retina, between the compound, facetted eye of insects and crustaceans, and that of man, as to perception of light and motion. The sensation of color is probably a function of the position in the cell of the terminal perceptive apparatus, and there is no sensation corresponding to white of higher animals.

Scalinci (232, **Studies on the physico-chemical constitution of the aqueous**) studied the osmotic concentration of the aqueous in dogs, which shows a higher value for this factor, as well as for osmotic pressure and electric conductivity than does blood serum, while its viscosity is much lower. Aqueous drained off from the anterior chamber 1 hour after paracentesis has increased viscosity and diminished conductivity. The normal chemico-physical characteristics are not fully regained until 24–48 hours later. There was some rise in the protein content after instillation of mydriatics and meiotics, and this is also noted after stimulation of the

cervical sympathetic due to vasomotor disturbance. Judging from these reactions, the aqueous is to be considered, not as a transudate, but as a secretion product of the ciliary epithelium.

Hess (233, **Dark adaptation and visual purple in fowl and doves**) tested the hypothesis that the adaptive faculty of the cones is lacking in the rods, by studying the faculty of dark adaptation in daylight birds, which have a retina composed mainly of cones. The method consisted in determining the limit of illumination at which chickens would begin, and cease, to pick up kernels of wheat. The results did not show the expected night blindness.

Domestic fowl and albinotic turtle doves show an increase of sensitiveness after adaptation in the dark which is hardly less marked than in human beings. Sections of the retina, treated with benzol which removes the light-resistent pigment, showed traces of visual purple in retinæ of the fowl and doves which had been adapted to darkness.

Hess (234, **Studies on light and color sense of day birds**) showed by strewing kernels of grain on a floor illuminated with variously colored spectral light that the visible limit of the spectrum at the long wave-length end corresponds rather closely to that of man, but is markedly shortened, particularly in doves, at the violet end. Primary color stimulation probably takes place in the outer member of the cones.

Abelsdorff (235, **Notes on color vision of day and night birds**) infers from pupillary contraction in day birds (domestic pigeons) on exposure to colored light that there is diminished perception for red and green in comparison to man, with a proportional excess in night birds (owls). The pupil of a dog reacts to color like that of human beings, while the cat's eye shows the pupillary reaction characteristic of night birds, *i.e.*, increased sensitiveness for blue light.

Hess (236, **Extent of the pupillo-motor area of the retina**) tested the pupillo-motor functions of various regions of the retina by uniform constant and diffuse illumination of the central area of the retina, as it is optically impossible to illuminate isolated areas, either central or peripheral. The light source was moved in an arc about the fixation point, and the consensual reaction of the pupil studied entoptically in the other eye. When the light stimulus was moved from the

blind spot to a point equally distant from the centre of the retina, there was no pupillary reaction unless the image had been brought to a point nearer the fovea. The periphery, even when adapted to darkness and theoretically hypersensitive, causes no pupillary reflex. Only a small retinal area, *4mm* wide, has any action whatever, so that the existence of a hemiopic pupillary reaction is rendered questionable. In birds, this function is located in the outer members of the cones.

Dimmer (237, **Human macula lutea and entoptic phenomena connected with it**) opposes Gullstrand's theory that the color of the macula is due to changes post-mortem. Freshly enucleated eyes illuminated by arc light showed a definite yellow area. Ophthalmoscopic examination with daylight shows this clearly. After death the color diffuses and the yellow spot appears larger.

Gullstrand (238, **The question of the macula**) answers the foregoing by stating that the color seen is an orange yellow due to the pigment epithelium illuminated by the usual light sources used in ophthalmoscopic examination. The yellow color seen by Dimmer was due to contrast or to induction of color sensation by the bright light source. Fresh retinæ detached by shaking under water show no yellow color at all. The latter develops post mortem from fluid exuding from the choroidal capillaries, and from the epithelium pigment.

Isakowitz (239, **Quantitative study of micropsia due to concave lenses. Theory of judgment of distance and size**) made a quantitative determination of micropsia, observed when emmetropes or hypermetropes look through concave glasses, by having his subjects look through a binocular tube. The image of the object seen through the concave lens was then compared with that of the other eye. The diminution was found to be proportional to the accommodation corresponding to the concave lens used, and amounted to 2.0 with an accommodation of 10 D. This amount is much too small to be explained by the Donders-Foerster theory of micropsia as a result of error in judgment of apparent distance and faulty inference as to size, depending on strain of convergence and accommodation.

Neopen (240, **A reaction of iris tissue to light**) studied the

influence of light on the tissue of the iris and was able to find a positive reaction in cephalopods, fishes, amphibia, reptiles, and birds. Brown-Sequard was one of the first to show that the iris muscle of fishes and batrachians reacts by contraction on exposure to light.

Dubois and Castelain (241, **Study of the motor innervation of the iris**) found, in dogs, that after simultaneous section of the cervical sympathetic and oculomotor there is absence of the pupillary dilatation regularly following stimulation of a sensory nerve or of the cerebral cortex. The trigeminus has no part in the production of this reflex pupillary dilatation. Electric stimulation of the oculomotor nerve, from its point of emergence, causes contraction of the pupil. Berger.

Scalinci (242, **Nature and mechanism of production of intraocular fluids**) studied the function of the epithelium of the anterior chamber by chemical analysis of the aqueous after the cells had been destroyed by injections of fluoride of sodium. He concludes that the aqueous is a secretion from the ciliary epithelium, not depending on nerve action, and consisting mainly of sodium chloride and other water-soluble salts which tend to keep up hydraulic pressure in the "intraocular carotid" by absorbing water.

Fortin (243, **Retinal circulation and its influence on certain phosphenes**) made entoptic studies with the Cooper-Hewitt lamp and a condensing lens, putting a sheet of blue glass before the eye. The visual field of the eye appears in a uniformly blue light in which the capillaries of the extra-foveal retina appear entoptically, dilating synchronously with the pulse. They appear to be stained blue as in a methyl-blue microscopic specimen, when seen through a stenopaic opening moved to and fro in front of the eye. Berger.

Pergens (244, **Studies in visual acuteness**) discusses the *minimum separabile* as a basis of the measurement of visual acuteness, and describes his "isostomatic" test types. In these the spaces of the optotypes represent an angle of 1 minute. The best form is a couple of squares, black on a white ground, whose distance from one another is equal to their diameter. Disks and dots are less suitable. The length of lines, as in the pot-hook or illiterate E types of Snellen, has a more marked influence on their visibility, than the number. Berger.

Ovio (245, **Observations on Mariotte's blind spot**) studied the blind spot, in regard to size, shape, extent, and position, according to various authors, and in the light of personal experiments with stereoscopy, Maddox camera, and so on. Accommodation has little effect on its size, and the latter corresponds pretty closely in size and position to the figures of theoretic calculations. Irradiation has a marked effect and depends on aberration, diffuse reflection, and local false diffusion. During accommodation the blind spot appears to sink, on account of the sinking of the lens which accompanies contraction of the ciliary muscle. At the margin of the spot there is an area of relative blindness for white and a more extensive area of relative color blindness. The color perception of the immediate neighborhood of the blind spot is similar to that of the periphery of the retina, and exhaustion phenomena are marked. Judgments of form and size are very variable, as the blind spot has no sensation, but merely offers an illusion of one. CALDERARO.

VI.—REFRACTION AND ACCOMMODATION.

246. STEIGER, A. **Changes in corneal astigmatism and refraction in the course of 5½ years. 3000 measurements.** *Zeitschr. f. Augenh.*, xviii., p. 103.

247. STEIGER, A. **Study of heredity in corneal curvature.** *Ibid.*, No. 17, p. 307.

248. v. GENS (HAAG). **Acquired nystagmus cured by correction of hyperopia.** *Ned. Tydschr. v. Geneesk.*, No. 5, 1907.

249. CHIARI, C. **Astigmatism against the rule from contraction of superior and inferior rectus.** *Arch. di Ottalm.*, Feb.-March, 1907.

250. HESS, C. **Modern views on physiology and pathology of accommodation.** *Journ. Amer. Med. Ass'n.*, July 20, 1907.

251. STRAUB, M. **Formulæ for refraction and optical adjustment of the eye.** *Ophth. Rev.*, April, 1907.

252. JACKSON, ED. **Amplitude of accommodation at different periods of life, and its relation to eye-strain.** *Ann. of Ophth.*, July, 1907.

253. THOMPSON, H. W. **Eyesight of the poorer city children.** *Brit. Med. Journ.*, Sept. 14, 1907.

STEIGER (246, **Changes in corneal astigmatism and refraction in the course of 5½ years. 3000 measurements**) studied the changes in corneal refraction and astigmatism in 1300 boys' and 1700 girls' eyes, at an interval of over 5 years. Astigmatism of low degree or against the rule does not tend to

alter, while degrees of 1–2 D. tend to increase between the ages of 6 and 12, while the cornea tends to become somewhat flatter, and individual differences of corneal refraction become less marked.

Steiger (247, **Study of heredity in corneal curvature**) found a certain family resemblance in the corneal refraction and astigmatism, but the influence of inheritance was obscured by the changes due to growth, although it is of undoubted importance.

v. Gens (248, **Acquired nystagmus cured by correction of hyperopia**) observed horizontal nystagmus in the right eye of a boy of 11 who had complained of eye-strain for about a month. The disturbance was noted only during near work. Binocular nystagmus developed after a few moments during examination of the vision. Vision normal, with acceptance of weak convex lenses. Ophthalmoscopy showed low myopia, but under atropin, a hyperopia of 2.5 D. was found, after correction of which the nystagmus improved greatly in the course of a couple of months.

Chiari (249, **Astigmatism against the rule from contraction of superior and inferior rectus**) investigated the influence of the recti muscles on corneal curvature. He concludes that both the normal and the astigmatic cornea change their static conditions on forced rotation of the globe. The contractions of the recti may take place simultaneously in both principal meridians, or alternately. These contractions generally shorten the radius of curvature of the meridian in which the muscles lie, and increase the radius of the meridian at right angles to them. Contraction of the superior and inferior rectus causes astigmatism with the rule, the inverse variety being caused by contraction of all four recti. The variations of corneal curve are greatest in young persons, on account of greater elasticity of the membrane and tonicity and strength of the muscles. Head tilting tends to correct astigmatism with the rule, while astigmatism against the rule is compensated for by leaning the head forward or backward. Calderaro.

Hess (250, **Modern views on physiology and pathology of accommodation**) offers an interesting presentation of this subject based principally upon his own observations. He

brings out a new phenomenon which takes place in extreme accommodation as follows: if the pupil is dilated with homatropin and then if eserin is instilled, the ciliary muscle contracts before the sphincter and the lens is loosened by the slacking of the suspensory ligament and actually drops about 0.50*mm* by gravity and the iris can be shown to be tremulous. This displacement of the lens can also be demonstrated by experiments with entoptic images of normal lens opacities. Hess has also refuted the common belief that intraocular pressure is increased in accommodation. Thus he was able to show by experiments upon animals with the manometer that even under strong electrical stimulation of the ciliary muscle the tension was not in the slightest affected. The practical bearing of this statement on the cause and treatment of myopia is of importance since intraocular pressure can no longer be held accountable, and the ordering of lenses for full correction is justified. He also believes that the ciliary muscle continues to hold its power through life and to maintain the same relation to convergence, and that it does not become inactive or atrophy with the progress of presbyopia. However with a given amount of convergence the proportionate contraction of the ciliary muscle produces little change in the lens curvature in those who are presbyopic, hence the failure of accommodation is due entirely to rigidity of the lens.

Regarding unequal contraction of the ciliary muscle to correct astigmatism he has never seen evidence to confirm that supposition. ALLING.

STRAUB (251, **Formulæ for refraction and optical adjustment of the eye**) suggests that the usual conventions to express conditions of refraction are incorrect: −4 D is used to express four dioptries of myopia, but insomuch as −4 D *corrects* the error, the true refraction is + 4 D. The correct formula for four dioptries of myopia is E + 4 D, for a similar hyperopia E − 4 D. For astigmatism the same is true. It is not necessary to indicate the refraction on limbs of a cross, the figures can be equally well placed above or below a horizontal line

$$\frac{\text{E Vert:}}{\text{E} - 3\ \text{D: hor}} \qquad \frac{\text{E } 30^\circ \text{ nasal}}{\text{E} - 3\text{: } 60^\circ \text{ temporal, etc.}}$$

The refraction can be more scientifically expressed by the formula $-\frac{1}{p'}+\frac{1}{f}=\frac{1}{p''}$. It is based upon the fact that the convergence of a pencil of rays is measured by the inverse value of the height of the pencil.

Straub claims that his new notation is *simpler*, and would be a great advantage for publication involving refraction cases in the medical journals intended for general practitioners. We fear that the general practitioner himself would much prefer the old *complicated* notation.

T. Harrison Butler.

Jackson (252, **Amplitude of accommodation at different periods of life, and its relation to eye-strain**) who always tests the amplitude of accommodation in refraction cases, presents an interesting study of the statistics of 3346 cases. Regarding the accommodation in childhood he refutes the usual opinion that it gradually diminishes from birth. He believes that it does not reach its maximum for some time and then remains practically constant until the eighth or tenth year. He further affirms that latent hypermetropia is more frequent and more troublesome after 40 than before. He finds that women even from childhood have a lower degree of accommodation than men. He calls attention to the possibility of a difference in accommodation in the two eyes which should not be overlooked. Alling.

Thompson (253, **Eyesight of the poorer city children**) remarks that quite apart from errors of refraction visual acuteness varies in different individuals. This may be a matter of training, a detective entering a room noticing more than an ordinary person. Children have been found to vary in visual power according to their environment. Thompson as oculist to the Glasgow School Board had ample scope for investigating the question. In one session he examined the eyes of over 52,000 children above the infant department stage. The primary sight testing was done by the teachers, and 55% were found to have defective sight. Many of them were found to be merely amblyopic, having neither ametropia nor obvious disease; they could not be brought up to the normal standard by any optical correction. The majority of these cases had an acuteness of $\frac{6}{12}$ or $\frac{6}{18}$, but some were as low as $\frac{6}{36}$ or $\frac{6}{60}$. The proportion of these *functionally*

defective children was 14%. On comparing the various schools it was found that the number of defective visions which could be improved by spectacles was approximately the same; the proportion of functional cases, however, varied widely in different schools. A school with 25% of its children functionally defective was situated in a poor district in the centre of Glasgow; one with but 3% so defective was on the edge of the city within sight of the open country. The schools were arranged on a chart which showed that the percentage of amblyopia rose from the peripherally situated schools to those in the centre of the city. (This chart is contained in the Report by the School Board of Glasgow for 1906.) The visual standard was lowest in the slum schools, highest in the better class schools; but the poorest country children were found to have better vision than the city children. Thompson asks the question, "Can anything be done to improve the city child's vision?" He thinks city children should in the infant schools not be made to pore over minute work, and every effort should be made to train their sharpness of vision for distant objects. Sewing should be abolished in the infant curriculum, and the teaching should be done by means of objects, figures, and letters which are large in size, and placed at a distance from the pupils. All writing and drawing should be on a large scale, and ruled paper should be widely spaced. Small multi-colored squares of cardboard should be avoided. The general nutrition and hygienic conditions must be improved. T. Harrison Butler.

VII.—MUSCLES AND NERVES.

254. Asch. **Ocular paralyses after spinal anæsthesia.** *Muench. med. Wochensch.*, No. 13, p. 613, 1907.

255. Barany, R. **Reflex vestibular and optical eye motions. Their significance in diagnosis of ocular palsies.** *Ibid.*, No. 22–23.

256. Fejér, J. **Clinical picture of ophthalmoplegia interna.** *Arch. f. Augenh.*, lvii., p. 179.

257. Lagrange, F., and Moreau. **Etiology of strabismus.** *Arch. d'opht.*, xxvii., p. 209.

258. Rochon-Duvignaud. **Orbicularis spasm treated by supra-orbital neurectomy.** *Soc. d'opht. de Paris*, July 2, 1907 .

259. Pasetti, G., and Salani, C. **Progressive nuclear external ophthalmoplegia of familiar type.** *Ann. di Ottalm.*, xxxvi., No. 3–4, p. 281.

260. Shannon, C. **Conjugate palsy of the upward and downward movements of the eye. Two cases.** *Ann. of Ophth.*, Jan., 1907.

261. Posey, W. C. **Chronic external ophthalmoplegia.** *Amer. Journ. Med. Science*, Aug., 1907.

262. Fisher, J. H. **Transient ophthalmoplegia externa with severe attacks of headache.** *Ophth. Rev.*, Feb., 1907.

263. Alt. A. **On the musculus dilatator pupillæ.** *Amer. Journ. of Ophth.*, Sept., 1907.

264. Carrol, J. J. **Metastatic conjunctivitis in gonorrhœa.** *Journ. Amer. Med. Ass'n*, July 13, 1907.

265. Beaumont, W. M. **Synergic movements of eyelids and mouth.** *Brit. Med. Journ.*, Sept. 14, 1907.

Asch (254, **Ocular paralyses after spinal anæsthesia**) reports 4 cases of abducens paralysis in 400 spinal injections, 3 after stovain, and 1 after tropococain. In 1 case the paralysis was bilateral. The paralysis developed in from 4 to 11 days, and lasted from 6 days to 6 weeks. The anæsthetic appears to have affected the nerve rather than the nucleus, as the toxic fluid could hardly reach the latter point, and would involve the neighboring facial, pneumogastric, and hypoglossal. Stovain is decidedly dangerous on account of its irritative action on motor nerves. After spinal injection the patient should be kept at rest for some time with raised trunk.

Barany (255, **Reflex vestibular and optical eye motions. Their significance in diagnosis of ocular palsies**) recalls Wernicke's clinical observation that reflex eye motions may persist after voluntary movements have been abolished. To produce vestibular nystagmus he used a revolving chair or syringed the ear with hot water. Optical nystagmus was produced by fixation of a revolving cylinder with black stripes. In conjugate paralysis to the left, vestibular irritation causes nystagmus toward the opposite side.

Fejér (256, **Clinical picture of ophthalmoplegia interna**) reports 7 cases of unilateral isolated ophthalmoplegia interna, in 4 of which there was a previous history of specific disease.

Lagrange and Moreau (257, **Etiology of strabismus**) found errors in 18% of the cases. In 41% there was constitutional or nervous disorder. Of the 562 cases, 19% only were emmetropic, and even in these there was a family history of squint, alcoholism, syphilis, or some ocular anomaly.

Rochon-Duvignaud (258, **Orbicularis spasm treated by**

supraorbital neurectomy) operated on a case of obstinate blepharospasm by tearing out the supraorbital nerves on either side. There was complete cessation of the spasm in 10 days, but recurrence of a mild degree later on. BERGER.

SHANNON'S (260, **Conjugate palsy of the upward and downward movements of the eye**) patients were a brother and sister ages 9 and 16. Both were imperfectly developed mentally but showed no other signs of nervous disorder. Vertical movements of the eyes were entirely in abeyance in both while the lateral rotations were normal. The power to converge was unimpaired in the boy but completely lacking in the girl. BLAKE.

POSEY (261, **Chronic external ophthalmoplegia**) calls attention to a rare manifestation as illustrated in the case of a girl of 16 who had marked ptosis on both sides. The right eye was fixed looking straight forward and the left was slightly divergent. The only motion of the eyeballs was downward about *2mm.* Pupils reacted to light and accommodation. Vision was R. E. $\frac{5}{5}$, L. E. $\frac{5}{7}$. The author does not state the age at which the affection began in his case but remarks that its onset is usually in infancy or early childhood. ALLING.

FISHER (262, **Transient ophthalmoplegia externa with severe attacks of headache**) records five cases in which a paresis of an external ocular muscle which persisted for some time but eventually recovered was associated with severe headache and pain in the eye. Similar cases were collected by Spicer and Ormerod (Trans. Ophthal. Soc. of Gt. Brit., vol. xvi.) under the title of "Recurrent Paralysis of Ocular Nerves." The headache is not the same as the headache of migraine, and these cases are probably not examples of this disease. The pain is very severe, and not necessarily unilateral. In the recorded cases it was occipital in two; occipital followed by retro-ocular in one; primarily retro-ocular in one; and in another situated in the temporo-malar and frontal regions. One occipital case had all his life suffered from hemicrania. Temporary obscuration of vision is a feature of some of these cases. There have been few autopsies on cases of ophthalmic migraine. In one Grübler found plastic exudation in the basal subarachnoid spaces, with

fibrous adhesions round the third nerve extending to the chiasma. Other post-mortem examinations have shown a fibroma or chondro-fibroma in the ocular nerve involved. In Fisher's cases the partially paralyzed muscles were: the internal rectus in the first case; the superior oblique in the second; the interior rectus in the third; and the external rectus in the fourth and last example recorded. All complained of diplopia. The disease may be allied to herpes ophthalmicus associated with extra-ocular paralysis.

T. HARRISON BUTLER.

ALT (263, **On the musculus dilatator pupillæ**) finds anterior to the pigment layer of the iris a single row of spindle cells with rod-shaped nuclei and indistinct cell outlines which he holds is the dilatator. Its action he believes to be weak and enhanced by contraction of the arteries of the iris and by the relaxation of the sphincter. ALLING.

CARROL (264, **Metastatic conjunctivitis in gonorrhœa**) finds no gonococci in this form of conjunctivitis. Iritis and iridocyclitis are usually added and an arthritis is generally associated. The conjunctivitis shows a tendency to recur. All reported cases have occurred in males. Three theories are offered to explain the disease : (1) direct transference of gonococci to the conjunctival sac by the blood-vessels, (2) mixed infection in which the gonococcus is of secondary importance, and (3) action of gonococcus toxins without the presence of the organisms. The writer believes the last to be the correct explanation of the disease and reports two cases in which no organisms were found in frequent examination of slides or cultures. ALLING.

BEAUMONT (265, **Synergic movements of eyelids and mouth**) describes a case of a child 9 months old with congenital ptosis and epicanthus, which when trying to open the eyes opened its mouth as well. A photograph is appended. Such synergic movements are common in children who have difficulty in opening the eyes from congenital or acquired causes. Beaumont has published another case (*Lancet*, 1893, vol. i.). The association is seen in gaping but not in yawning. Darwin notes the association ("Expression of the Emotions," page 278, 1872 edition). Dryden in *Cymon and Iphigenia* writes: "The fool of Nature stood with stupid eyes, and

gaping mouth that testified surprise." It is recognized in the after-treatment of cataract operations; food which requires mastication is not given for some days. If the cause be due to abnormal innervation we should expect the abnormality to be lifelong. In a case of Kraus's (*Ophth. Review*, vol. xiii., page 309) the eye movements became less vigorous after some years, and in another ceased altogether, but Blok records a case in which they became more marked. In Beaumont's first case an operation for ptosis cured the "jaw winking." The cause may be atavistic, a return to ancestral habits. Palgrave says "I gape as a beest dothe that intendeth to byte, which holdeth his mouthe open afore." The author concludes that associated movements of mouth and eyes are normal. These freak-like and apparently purposeless associated movements of all sorts are reminders of our antique, though humble, ancestry; mere echoes ringing down the files of time.

T. Harrison Butler.

NOTICES

The Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology takes place at Cleveland, Ohio, August 27, 28, and 29, 1908. Mr. J. B. Lawford, F.R.C.S., of London, England, will deliver an address.

The Forty-fourth Annual Meeting of the American Ophthalmological Society will be held on July 15th and 16th at the Fort Griswold House, New London, Conn. Dr. S. D. Risley is president. Major Henry Smith, of Jullunder, India, will deliver an address on the Treatment of Immature Cataract.